
3.0 AFFECTED ENVIRONMENT

This chapter describes the environmental baseline conditions in the area potentially affected by PSC's CO₂ Pipeline Project. The BLM's NEPA Handbook (H-1790-1) requires that all EAs address certain Critical Elements of the Human Environment. These critical elements are presented below along with the location in Chapters 3.0 and 4.0 where the element is discussed. If the element does not occur within the project area or would not be affected, this is indicated below, and the element is not discussed further in the EA. This elimination of nonrelevant issues follows the Council on Environmental Quality guidelines as stated in 40 CFR 1500.4.

- Air Quality – Sections 3.1 and 4.1.
- Areas of Critical Environmental Concern – Section 3.4, 4.4, and 4.8.
- Cultural Resources – Sections 3.14.1 and 4.14.1.
- Drinking Water/Ground Water Quality - Sections 3.4 and 4.4.
- Environmental Justice - Sections 3.12 and 4.12.
- Floodplains - Sections 3.4 and 4.4.
- Hazardous or Solid Wastes – discussed for applicable resources (Sections 4.4, 4.5, and 4.6).
- Invasive Non-native and Noxious Plant Species - Sections 3.5.2 and 4.5.2.
- Native American Religious Concerns – Sections 3.14.2 and 4.14.2.
- Paleontological Resources – Sections 3.3 and 4.3.
- Prime or Unique Farmlands - would not be affected.
- Threatened, Endangered, Candidate, or Sensitive Species - Sections 3.5.4, 3.6.2, 3.7.6, 4.5.4, 4.6.2, and 4.7.
- Wetlands and Riparian Zones - Sections 3.5.1 and 4.5.1.

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- Wild and Scenic Rivers - would not be affected.
 - Wilderness – Sections 3.9 and 4.9.

Numerous technical reports were prepared as support documents for this EA. Copies of these technical reports are available for review at the following locations:

- BLM Casper Field Office
2987 Prospector Drive
Casper, Wyoming 82604
- BLM Lander Field Office
1335 Main Street
Lander, Wyoming 82520

3.1 Air Quality

3.1.1 Climate

The climate along the proposed pipeline route is characterized by large annual variations in temperature, low precipitation, and high winds. Climatological summaries of temperature and precipitation were examined for four stations near the pipeline route: Reno, Midwest, Wind River 2, and Jeffrey City. Normals, means, and extremes in temperature, precipitation, and winds were examined for Casper, which is located southeast of the approximate midpoint of the proposed route. The annual average maximum temperature is approximately 58°F, and the annual average minimum temperature is approximately 30°F. The record high temperature at Casper was 104°F in July 1954. The record low at Casper was –41°F in December 1990. The annual average total precipitation (water equivalent) is approximately 12 inches. Annual average snowfall is approximately 45 inches, with the northernmost end of the proposed route receiving approximately 22 inches of snow per year. The maximum monthly total of snow, ice pellets, and hail at Casper was 62.8 inches in December 1982. The mean wind speed at Casper is 12.8 miles per hour (mph), and the prevailing direction is from the southwest. The peak gust was 67 mph from the southwest and was recorded in January 1990.

3.1.2 Air Quality

All counties through which the proposed pipeline route would pass (Campbell, Johnson, Natrona, and Fremont) are classified as attainment (meeting air quality standards) for all pollutants. The Primary and Secondary National Ambient Air Quality Standards for inhalable particulate matter,

10 microns or less (PM₁₀) are 150 micrograms/cubic meter (µg/m³) over a 24-hour period and 50 µg/m³ over a year, respectively. Campbell, Natrona, and Fremont counties currently have PM₁₀ monitors. There are no monitoring sites in Johnson County. Annual average PM₁₀ concentrations in these counties vary from approximately 17.5 µg/m³ to approximately 33 µg/m³ compared to the annual standard of 50 µg/m³. The maximum 24-hour PM₁₀ concentration measured in these counties since 1994 was 112 µg/m³ in 1995 in Campbell County. This compares favorably with the 24-hour PM₁₀ standard of 150 µg/m³.

3.2 Geology and Soils

3.2.1 Geology

Geologic conditions throughout the project area are described, since they may constitute hazards to the construction, operation, and/or reliability of the proposed pipeline. Geological hazards that may increase the risk of pipeline construction problems, pipeline failure, or accidents along the pipeline route or at facility locations are identified. Any faults, landslide features, windblown sand deposits, or mined out/mine subsidence areas crossed by or adjacent to the proposed pipeline route are listed in Table 3-1. This table also lists earthquake epicenters within 25 miles of the proposed route. Recent studies by the Wyoming Geological Survey indicate that potential earthquake magnitudes in the four counties crossed by the proposed pipeline are estimated to be approximately 6.75 (as measured on the Richter Scale) in Natrona and Fremont counties, and 6.10 in Johnson and Campbell counties.

3.2.2 Soils

The proposed pipeline route is located in two Major Land Resource Areas as described by the Natural Resources Conservation Service (formerly Soil Conservation Service) (1981). The southern portion, MP 112 to approximately MP 205, is located in the Central Desertic Basin and Plateau area. This area is characterized by broad intermountain basins and piedmont plains with elevations ranging from 5,500 to 6,500 feet, including an area up to 7,400 feet near Green Mountain (MP 112 to 127), with an average annual precipitation of 7 to 9 inches and a frost-free season of 110 to 120 days.

The area between MP 205 and Hartzog Draw (MP 267) is located in the northern high plains area. This area consists of gently sloping to rolling dissected plains underlain by shale, siltstone, and sandstone, including areas with steep sideslopes bordering major streams and intermittent drainageways. Elevations range from approximately 4,500 to 5,600 feet, with an average annual precipitation of 9 to 12 inches, and a frost-free season of about 120 days.

Table 3-1
Potential Geologic Hazards Along the Proposed PSC CO₂ Pipeline

Distance (miles)	Approximate Location (MP)	Type of Geologic Hazard
0.2	115.9-116.1	Mapped landslide feature
0.5	116.1-116.6	Mapped landslide feature
0.2	116.7-116.9	Mapped landslide feature
0.1	116.9-117.0	Mapped landslide feature
0.1	117.3-117.4	Mapped landslide feature
0.1	117.5-117.6	Mapped landslide feature
0.2	117.6-117.8	Mapped landslide feature
0.2	117.8-118.0	Mapped landslide feature
0.1	118.2-118.3	Mapped landslide feature
0.3	118.5-118.8	Mapped landslide feature
0.3	118.8-119.1	Mapped landslide feature
0.2	119.4-119.6	Mapped landslide feature
Total 2.5 miles (22.7 acres)		
1.0	122.0-123.0	Active fault traversed – Green Mountain segment of South Granite fault system
1.0	157.0-158.0	Possible fault – inferred location – pipeline crosses North Granite Mountain fault segment
2.5	158.5-161.0	Possible fault – inferred location – pipeline crosses North Granite Mountain fault segment
Total 4.5 miles (40.9 acres)		
3.3	188.8-192.1	Windblown sand deposits
Total 3.3 miles (30 acres)		
NA ¹	116	Earthquake epicenter # 5-29-73
NA	121	Earthquake epicenter # 8-12-16, III
NA	148	Earthquake epicenter # 1-24-54, IV
NA	151	Earthquake epicenter # 4-22-73, V, 4.8 _B
NA	152	Earthquake epicenter # 3-25-75, 4.8 _B
NA	160	Earthquake epicenter # 1-9-68, 3.8 _B
NA	170	Earthquake epicenter # 61-17-73
NA	171	Earthquake epicenter # 12-19-75, 3.5 _L
NA	177	Earthquake epicenter # 11-14-1897, VII
NA	177	Earthquake epicenter # 6-25-1894, V
NA	183	Earthquake epicenter # 8-19-59, IV
NA	183	Earthquake epicenter # 8-27-48, IV
NA	183	Earthquake epicenter # 10-36-22, IV
NA	183	Earthquake epicenter # 12-10-1873, III
NA	206	Earthquake epicenter # 12-11-42, IV
NA	221	Earthquake epicenter # 3-10-93, 3.2 _L
NA	237	Earthquake epicenter # 6-3-65, 4.7 _B
Total Sites = 17		

Sources: Case 1986a,b.; Case and Boyd 1984, 1987; Case et al. 1995; Love and Christiansen 1986.

Explanation: III-VII – Intensities derived from Modified Mercalli Intensity Scale

2.0-5.0 – Magnitudes

_L – Local Magnitude (Richter)

_B – Body Wave Magnitude

NA¹ = Distance not applicable

Soil association mapping was examined for Natrona, Johnson, and Campbell counties. Detailed Order 3 survey data are also available for most of the area traversed by the proposed pipeline and are contained in the *Soils, Vegetation, and Agriculture Technical Report* for the Amoco Carbon Dioxide Projects EIS (Planning Information Corporation 1988). The various soil map units within the proposed project area were combined into generalized groups of soils to evaluate potential impacts and to determine effective erosion control measures, reclamation, and revegetation potential in the area. Soils that are particularly susceptible to impacts and that may be disturbed during construction are considered “fragile” soils. Delineation of fragile soils was based on the following BLM criteria (BLM 1985a):

- Shallow over bedrock (less than 20 inches);
- Underlain by hard bedrock;
- Sand, loamy sand, or clay-textured surface and subsoil layers;
- Soils containing more than 35 percent coarse fragments by volume;
- Permeability less than 0.6 inch per hour;
- Water table less than 72 inches;
- Soil pH greater than 8.5, salinity more than 16 millimhos in the upper 40 inches; and
- Occupying slopes steeper than 15 percent.

While the potential for having a slope limitation is indicated by the soil map unit, actual steep slope locations were also identified (from 1:24,000 topographic maps) by MP locations along the pipeline route. Only significant areas of steep slopes (i.e., areas of at least 0.1 mile long) were identified. A list of sensitive soils is provided in Table 3-2.

County soil maps for Natrona and Johnson counties were used to characterize the types of soils crossed by the proposed lateral pipeline route. Typical soils throughout this area consist of shallow to deep, well drained, nearly level to steep soils on hills, ridges, and alluvial fans (Malnor et al. 1997). These soils formed in alluvium and residuum derived from shale. Soil limitations as they relate to pipeline operation and/or construction (limitations such as a high erosion potential or shallow depth to bedrock) are discussed in Chapter 4.0.

Table 3-2
Sensitive Soils Along the Proposed PSC CO₂ Pipeline Route

Distance (miles)	Location by Milepost	Major Limiting Factor(s)
0.6	112.4-113.0	Sandy, erosion
0.1	113.0-113.1	Slope, erosion, shallow bedrock (soft)
0.2	113.2-113.4	Slope, erosion, shallow bedrock (soft)
0.7	113.5-114.2	Sandy, erosion
0.6	114.2-114.8	Slope, erosion, coarse fragments
0.7	114.8-115.5	Coarse fragments
0.7	115.5-116.2	Slope, erosion, coarse fragments
0.2	116.6-116.8	Coarse fragments
0.3	117.0-117.3	Coarse fragments
0.1	117.5-117.6	Occasional flooding April-June; shallow water table (<1 foot) April-August
0.3	117.6-117.9	Slope, erosion shallow bedrock (hard)
0.5	117.9-118.4	Slope, erosion, shallow bedrock (soft)
0.1	118.4-118.5	Occasional flooding March-August; shallow water table (<1 foot) January-December
0.1	119.3-119.4	Occasional flooding April-June; shallow water table (<1 foot) April-August
2.9	123.1-126.0	Sandy, erosion
0.7	126.0-126.7	Slope, erosion, shallow bedrock (soft)
0.9	127.1-128.0	Slope, erosion, shallow bedrock (soft)
1.1	128.0-129.1	Sandy, erosion
0.7	129.1-129.8	Slope, erosion, shallow bedrock (soft)
0.7	129.8-130.5	Erosion
2.9	130.5-133.4	Slope, erosion, shallow bedrock (soft), sandy
0.5	133.4-133.9	Erosion
0.6	133.9-134.5	Shallow water table (4-6 feet) March-June
2.4	134.5-136.9	Sandy, erosion
1.1	136.9-138.0	Erosion
0.1	138.0-138.1	Shallow water table (4-6 feet) March-June
2.7	138.1-140.8	Erosion
7.2	140.8-148.0	Sandy, erosion
1.2	148.0-149.2	Slope, erosion, shallow bedrock (soft), sandy
0.1	150.1-150.2	Shallow water table (4-6 feet) March-June
0.2	150.2-150.4	Occasional flooding March-June; shallow water table (0-2 feet) April-July
2.6	150.4-153.0	Sandy, erosion
0.2	156.7-156.9	Sandy, erosion
0.6	158.5-159.1	Slope, erosion, shallow bedrock (soft)
0.8	159.1-159.9	Shallow bedrock (soft)
0.2	161.2-161.4	Slope, erosion, shallow bedrock (soft), clay
2.2	161.4-163.6	Shallow bedrock (soft)
1.5	164.7-166.2	Slope, erosion, shallow bedrock (soft)
0.9	166.8-167.7	Clay, pH
0.4	167.7-168.1	Erosion, shallow bedrock (soft)
0.7	168.1-168.8	Slope, erosion, shallow bedrock (soft), clay
0.2	168.9-169.1	Clay, pH
0.3	169.1-169.4	Slope, erosion, shallow bedrock (soft)
1.8	169.4-171.2	Erosion, shallow bedrock (soft)
0.3	171.2-171.5	Clay, pH
0.5	171.5-172.0	Erosion, shallow bedrock (soft)
0.3	172.0-172.3	Clay, pH
0.1	172.9-173.0	Clay, pH
0.3	173.5-173.8	Slope, erosion, shallow bedrock (soft), clay
0.4	174.5-174.9	Clay, pH
0.9	174.9-175.8	Slope, erosion, shallow bedrock (soft), clay
0.4	176.1-176.5	Clay, pH
0.7	176.5-177.2	Slope, erosion, shallow bedrock (soft), clay

Table 3-2 (Continued)

Distance (miles)	Location by Milepost	Major Limiting Factor(s)
0.2	177.2-177.4	Sandy, erosion
0.8	177.4-178.2	Slope, erosion, clay, pH
0.2	178.2-178.4	Sandy, erosion
2.1	178.4-180.5	Clay, pH
0.4	182.5-182.9	Slope, erosion, shallow bedrock (soft), clay
0.7	183.1-183.8	Clay
2.8	185.2-188.0	Sandy, erosion
0.7	188.0-188.7	Clay, pH
0.7	188.7-189.4	Erosion, shallow bedrock (soft)
2.7	189.5-192.2	Dune area; sandy, erosion, moderate slope
1.4	192.2-193.6	Clay, pH
0.1	193.9-194.0	Erosion, shallow bedrock (soft)
0.2	194.5-194.7	Slope, gully erosion
1.0	195.0-196.0	Slope, gully erosion
0.2	196.0-196.2	Clay, pH
0.5	196.3-196.8	Erosion, shallow bedrock (soft)
2.5	196.8-199.3	Clay
1.5	199.4-200.9	Slope, erosion, shallow bedrock (soft), clay
1.2	201.0-202.2	Clay
2.4	202.2-204.6	Slope, erosion, shallow bedrock (soft), clay
0.7	204.6-205.3	Erosion, shallow bedrock (soft)
4.1	205.3-209.4	Clay, pH
7.6	209.4-217.0	Slope, erosion, shallow bedrock (soft), clay
3.2	217.2-220.4	Clay
8.5	220.4-228.9	Slope, erosion, shallow bedrock (soft), clay
1.7	228.9-230.6	Slope, erosion, shallow bedrock (hard)
0.6	230.6-231.2	Clay, pH, erosion, shallow bedrock (soft)
4.5	231.2-235.7	Slope, erosion, shallow bedrock (soft), clay, pH
0.2	235.9-236.1	Clay, pH
1.2	236.3-237.5	Slope, erosion, shallow bedrock (soft)
0.4	237.5-237.9	Sandy, erosion
0.4	237.9-238.3	Slope, erosion, shallow bedrock (soft), pH
0.2	238.4-238.6	Occasional flooding – Spring
3.3	238.6-241.9	Slope, erosion, shallow bedrock (soft)
1.1	241.9-243.0	Erosion, pH
2.8	243.0-245.8	Slope, erosion, shallow bedrock (soft-hard)
0.3	245.8-246.1	Clay, pH
0.9	246.1-247.0	Occasional flooding – Spring
1.5	247.0-248.5	Clay, pH, shallow bedrock (soft)
1.3	248.6-249.9	Occasional flooding – Spring
1.5	249.9-251.4	Slope, erosion, shallow bedrock (soft-hard)
0.4	251.4-251.8	Occasional flooding – Spring
7.8	251.8-259.6	Slope, erosion, shallow bedrock (soft)
5.7	259.8-265.5	Slope, erosion, shallow bedrock (soft), pH
0.3	0.0-0.3 (Lateral)	Slope, erosion, shallow bedrock (hard)
0.3	0.3-0.6	Clay
0.5	0.6-1.1	Slope, erosion, shallow bedrock (soft), clay
0.2	1.1-1.3	Erosion, pH
0.9	1.3-2.3	Erosion, shallow bedrock (soft)
1.5	2.3-3.8	Slope, erosion, shallow bedrock (soft), clay
3.0	3.8-6.8	Clay, erosion, shallow bedrock (soft)
Total = 136.4 miles 1,240 acres		

3.3 Mineral and Paleontological Resources

Wyoming is divided into three major physiographic categories: mountains, the high northwestern plateau, and basins (Glass and Blackstone 1987). The proposed pipeline route would cross several local physiographic provinces including the Great Divide Basin, Sweetwater Uplift, Wind River Basin, Casper Arch, and Powder River Basin. The surface geological formations range from Pre-Cambrian to Recent; however, most of the formations in the project area were deposited during the Cretaceous and Tertiary periods.

Basins contain the majority of the state's mineral resources. Limestone, gypsum, bentonite, and phosphate frequently occur in outcrops along the basin margins. Coal and uranium deposits are found at the surface farther out in the basins. Underlying rock units are reservoirs for oil and gas deposits. Two coal basins would be crossed by the proposed pipeline: the Wind River (MP 164 to MP 194) and Powder River (MP 250 to MP 267). All of the coal reserves in the areas crossed by the pipeline are considered "hypothetical" (BLM 1985a). Hypothetical reserves occur in areas where coal is known to occur because of the geology, but they have not been measured to determine development potential. No coal occurs where ancillary pipeline facilities (valves, meter stations) are proposed.

The proposed pipeline route would cross uranium deposits in the Crooks Gap-Green Mountain area, and coal and sandstone beds of the Fort Union Formation in the Great Divide and Powder River basins (BLM 1985a). The Pumpkin Buttes area in southeastern Johnson County has significant uranium deposits. In these types of geological settings, open-pit or in-situ mining of uranium is usually proposed, depending upon the host bed material. Claims for uranium are staked along much of the proposed pipeline route. However, the economics of uranium production are currently unfavorable, and immediate or near future development of uranium along the pipeline route is not expected (BLM 1985a).

The proposed 7-mile lateral lies along the west-dipping limb of a large north-south trending anticline marking the western extent of the Powder River Basin (VerPloeg et al. 1980). Mineral resources between the Powder River Basin and the southern Bighorn Mountains are scarce. No coal fields or uranium deposits would be crossed by the proposed lateral. The Cody Shale underlies the entire length of the 7-mile lateral, and is considered a potential source for commercially economic bentonite deposits (Harris et al. 1985). The proposed lateral route does not cross any currently active sand, gravel, or bentonite quarries, however it does pass through a mine permit boundary held by the Benton Clay Company (Hausel and Glass 1980).

Paleontology is the geological science dealing with plant and animal life of past geologic periods as known from fossil remains. Fossils are rarely distributed homogeneously throughout a geologic

formation. Formations can indicate only a potential for fossils in any given area. The paleontological sensitivity of a geologic formation is directly related to the significance of the fossils contained within it. Wyoming is a state with areas of high potential paleontological resource value.

Generally, the proposed pipeline route would cross Tertiary geology in the basins and Cretaceous geology around the uplifts, arches, and anticlines. The fossils of the Cretaceous and Tertiary periods record the transition in dominant vertebrate life, as well as the continuing development of invertebrate and plant life forms. The western United States is the primary place where this transition and early Tertiary period is recorded in the fossil remains in geologic formations.

All geologic formations crossed by the proposed route are known to contain fossils. Most have significant sites in areas outside of the proposed route corridor. Table 3-3 shows the geologic formations that have high, moderate, or low potential for containing fossils of significant value. Table 3-3 also lists the 11 paleontological sites that the BLM considers significant. The following levels of paleontological sensitivity are used in this EA:

- High sensitivity formations are those containing known paleontological resources of high significance. Generally speaking, these formations have produced vertebrate fossil remains or are considered to have the potential to produce such remains.
- Moderate sensitivity formations rarely contain paleontological resources within or adjacent to the study area.
- Low sensitivity formations are those with no known paleontological resources, but generally have a resource potential based on their sedimentary origin.

A Class III paleontological inventory has been completed for the proposed pipeline route (Carpenter 1986). Fossils have been previously reported for the Mowry Shale, Frontier Formation, Cody Shale, Mesaverde Formation, Fox Hills Sandstone, Meeteetse Formation, Lance Formation, Fort Union Formation, Wasatch Formation, Wind River Formation, and the White River Formation, all of which occur along the proposed pipeline ROW. However, during the paleontological survey, fossils were found only in the Cody Shale (2 sites), Mesaverde Formation (1 site), Lance Formation (1 site), Wasatch Formation (17 sites), Wind River Formation (3 sites), and Split Rock Formation (1 site). Fossils were collected from all but one of these sites. Most discovered fossil sites are of minor significance. The 11 significant sites are summarized in Table 3-3.

Table 3-3
Paleontological Sensitivity of Geologic Formations or Stratigraphic
Units Crossed by the Proposed PSC CO₂ Pipeline

Formation/Stratigraphic Unit¹	Paleontological Sensitivity²	Distance Crossed (miles)
Alluvium and Colluvium	Low	1.6
Landslide Deposits	Moderate	0.4
Dune Sand & Loess	Low	6.6
Crooks Gap Conglomerate	Low	4.4
Cody Shale	Moderate	47.1
Battle Spring Formation	Moderate	0.8
Miocene Rocks	Moderate – High	34.8
Upper Miocene Rocks	Moderate – High	1.6
Precambrian Rocks	Low	0.8
Bug Formation (Pleistocene or Pliocene)	Moderate – High	1.4
Chugwater Formation	High	0.4
Wagon Bed Formation	High	1.2
Mesaverde Formation	Moderate	4.0
Fox Hills Sandstone	High	1.4
Fort Union Formation	High	0.6
Tullock Member (Ft. Union)	High	3.0
Lebo Member (Ft. Union)	High	1.1
Wind River Formation	High	14.6
Meeteetse Formation and Lewis Shale	Moderate – High	0.2
Fox Hills Sandstone and Lewis Shale	Moderate – High	0.8
Lance Formation	High	4.0
Frontier Formation	Moderate	1.8
Wasatch Formation	High	22.4
Total		155.0

Known Paleontological Sites³

Formation	Milepost	Primary Interest and Mitigation
Cody Shale	202.25	Plesiosaur Bones – Monitor Blading and OTI ⁴
	209-217	Fossil Bones – OTI
Mesaverde	179.5-180.3	Potentially Fossiliferous Strata – OTI
	233.5-234.3	Potentially Fossiliferous Strata – OTI
Lance	239.7	Possible Dinosaur Skeleton – Test Pits; follow up with OTI
Wasatch	256.0	Mammal Teeth – Recheck anthills before construction
	257.4	Mammal Teeth – Recheck anthills before construction
	258.0	Mammal Teeth – Recheck anthills before construction
	261.0	Mammal Teeth – Recheck anthills before construction
	261.5	Gastropods – Collect larger sample before construction
	264.5	Reexamine blowout before construction

¹Love and Christiansen 1985.

²BLM 1985a.

³Western Cultural Resource Management 1986.

⁴OTI = Open trench inspection.

The proposed 7-mile lateral route lies entirely within the Cody Shale. This formation is a marine shale unit deposited during the Cretaceous period (Love and Christiansen 1986). Marine shales commonly contain abundant fossil remains, however these remains are typically of small marine invertebrates and are not considered paleontologically significant.

3.4 Water Resources

3.4.1 Surface Water

Four classes of streams are identified by the WDEQ's, Water Quality Regulations entitled "Quality Standards for Wyoming Surface Waters," (WDEQ 1990). All Wyoming waters are designated as belonging to one of the following four water quality classifications. The streams located in the project area are classified as either II, III, or IV under the water quality standards.

- Class I: Those surface waters which shall be maintained at their existing quality and in which no further water quality degradation by point source discharges will be allowed.
- Class II: Those surface waters, other than those classified as Class I, which are determined by the Wyoming Game and Fish Department (WGFD) to be presently supporting game fish or have the hydrologic and natural water quality potential to support game fish.
- Class III: Those surface waters, other than those classified as Class I, which are determined by the WGFD to be presently supporting non-game fish or have the hydrologic and natural water quality potential to support non-game fish.
- Class IV: Those surface waters, other than those classified as Class I, which are determined by the WGFD not to have the hydrologic or natural water quality to support fish.

In addition to the above water quality classifications, the WGFD has developed classifications for fisheries, with an emphasis on trout waters. Fisheries classifications are presented in the aquatic resources section (3.7).

Water quality standards for surface water in the state of Wyoming establish criteria for pH, turbidity, dissolved oxygen, and temperature. In addition, as required by WDEQ, "toxic or potentially toxic materials shall not be present in any Wyoming surface waters in concentrations or combinations which would damage or impair the normal growth, function, or reproduction of human, animal, plant, or aquatic life." Unless, otherwise specified in the Wyoming standards, maximum allowable concentrations are based on the latest edition of Quality Criteria for Water published by U.S. Environmental Protection Agency (USEPA) or WDEQ (1998).

Floodplain issues in the project area would be limited to low-lying topographic areas adjacent to perennial streams and drainages crossed by the pipeline. No Flood Hazard Boundary Maps have been prepared for the vicinity of the pipeline route. In addition, no studies have been conducted by the State of Wyoming of flood-prone areas in the vicinity of the project. The absence of existing data is due primarily to the fact that there are no population centers in the project area.

The proposed pipeline route would traverse the northeast edge of the Great Divide Basin and the Sweetwater Basin before crossing the Granite Mountains. The route would then cross into the headwaters of the Powder River Basin after crossing tributaries of the North Platte River. Except for the Great Divide Basin, all rivers crossed by the project are in the Missouri River Basin.

The proposed pipeline route would cross 11 streams classified as perennial. These streams are listed in Table 3-4. Numerous intermittent and ephemeral streams and minor drainages (approximately 100), also would be crossed by the route. In addition, the pipeline would cross an inactive diversion ditch at MP 150.4; the ditch is approximately 4 feet in width and 18 inches in depth and flows to a nearby reservoir used for stock purposes. No wild or scenic rivers would be crossed by the route.

The pipeline would cross approximately 2.5 miles of the Salt Creek ACEC, in the Casper Field Office Area between MP 220.5 and MP 223 (BLM 1984a). Salt Creek and portions of Teapot Creek have been identified as sensitive drainages. Long-term stream monitoring surveys will continue to be performed in the ACEC as part of the Salt Creek ACEC Management Plan. The Management Plan has been implemented to reduce environmental impacts from energy development in the Salt Creek Drainage (BLM 1984a).

The most significant surface water resource that would be crossed by the pipeline is the Sweetwater River at MP 134.3. This river is rated Class II by the WDEQ at this location. Stream discharges at the Sweetwater River near Alcova station ranged from approximately 10 to 1,240 cubic feet per second (cfs) in 1990 through 1998. In most years, discharges usually ranged from approximately 20 to 800 cfs. Peak flows usually occurred in May and June. The Sweetwater River is used for livestock, irrigation, industrial purposes, municipal supplies, and wildlife.

The Sweetwater River originates at the southeast end of the Wind River Mountains and flows east to the North Platte River. In the vicinity of the pipeline crossing, the drainage from the north side of the river is derived from the Granite Mountains. In general, water quality is good, although suspended sediment and dissolved solids can reach moderately high levels during runoff (BLM

Table 3-4
Perennial Streams Crossed by the Proposed PSC CO₂ Pipeline Project

Stream Name	Milepost Number	Existing Pipeline Crossing¹	Water Quality Classification
Unnamed tributary to Crooks Creek	113.2	Yes	II
Sheep Creek	116.1	Yes	II
West Cottonwood Creek	119.5	Yes	II
Middle Cottonwood Creek	121.2	Yes	II
East Cottonwood Creek	124.3	Yes	II
Sweetwater River	134.3	Yes	II
Dry Creek	150.3	No	II
Poison Spider Creek	168.7	No	IV
Middle Fork Casper Creek	179.0	No	III
Salt Creek	235.9	No	IV
Meadow Creek	238.5	No	III

¹Indicates whether stream has been previously crossed by other pipelines in the immediate vicinity of the proposed crossing.

1986b). Based on water quality data analyzed for the Sweetwater River just north of Jeffrey City, occasional exceedences of Wyoming aquatic criteria have been shown for ammonia, boron, barium, cadmium, and mercury (Shepherd Miller 1999). Data indicate that total dissolved solids (TDS) and alkalinity are low for the Sweetwater River. Conversely, streams draining areas underlain by Tertiary sandstones and shales (such as the Wasatch Formation) with thin soil cover and sparse vegetation should have poor water quality due to high total suspended solids (TSS). Poison Spider Creek and Salt Creek have high levels of TDS, TSS, and alkalinity.

Perennial streams crossed at the southern end of the pipeline route (i.e., Crooks Creek tributary, Sheep Creek, and Cottonwood Creek tributaries), drain from the Green Mountains. The flow pattern in these streams typically consists of high run-off in the spring after snowmelt and low flows in the fall or early winter months. Surface water in these streams is characterized as predominately calcium bicarbonate, with hardness values exceeding 50 percent (Mariah Associates 1995). Most of these streams receive groundwater discharge from the Battle Spring Formation. Monitoring in some of these streams indicated that concentrations are generally within the WDEQ Class II Fish/Aquatic Life Standards. Occasional exceedences for ammonia, aluminum, iron, and mercury were shown in Middle Cottonwood Creek (Mariah Associates 1995).

3.4.2 Groundwater

Groundwaters in Wyoming are classified in order to apply standards to protect water quality. Groundwaters of the state are classified by use and by ambient water quality. Uses include domestic, fish and aquatic life, agriculture, livestock, and industry. Where waters are unappropriated, classification is made by ambient water quality. The WDEQ has established the following groundwater classifications (WDEQ 1993).

- Class I Groundwater of the State - This water is suitable for domestic use. The ambient quality for underground water of this suitability does not have a concentration in excess of any of the standards for Class I Groundwater of the State.
- Class II Groundwater of the State - This water is suitable for agricultural use where soil conditions and other factors are adequate. The ambient quality of underground water of the suitability does not have a concentration in excess of any of the standards for Class II Groundwater of the State.
- Class III Groundwater of the State - This water is suitable for livestock. The ambient quality of underground water of this suitability does not have a concentration in excess of any of the standards for Class III Groundwater of the State.
- Class Special (A) Groundwater of the State - This water is suitable for fish and aquatic life. The ambient quality of underground water of this suitability does not have a concentration in excess of any of the standards for Class Special (A) Groundwater of the State.
- Class IV Groundwater of the State - This water is suitable for industry. The quality requirements for industrial water supplies range widely and almost every industrial application has its own standards.
- Class V Groundwater of the State - This water is found closely associated with commercial deposits of hydrocarbons and/or other minerals or which is considered a geothermal resource. The following divisions of Class V Groundwater are made: Class V (Hydrocarbon Commercial), Class V (Mineral Commercial), or Class V (Geothermal) Groundwater of the State.
- Class VI Groundwater of the State may be unusable or unsuitable for use.

Groundwater along the pipeline route occurs in river alluvium and consolidated geologic deposits of sandstone, lignite, shale, and limestone. Depths of water are generally much greater than

50 feet, except in the vicinity of the Sweetwater River and Poison Spider Creek crossings where depth to groundwater is less than 20 feet. Dry Creek, at MP 150.3, is a perennial stream crossed by the pipeline, which is hydraulically connected to the aquifer under the Sweetwater River Basin. The saturated thickness of this aquifer ranges from 500 to 3,000 feet (Borchert 1987).

Alluvial deposits represent the highest ranked aquifers in terms of potential yield (Wyoming State Geological Survey 1996). Alluvial deposits are composed of clay, sand, and gravel that are derived from stream action and glaciation of upland areas (Boettcher 1972). The water level is usually within a few feet of the stream.

Other groundwater formations underlying the proposed pipeline route are characterized by water-bearing units that occur at greater depths than alluvial deposits. The principal water-bearing units are composed of sandstone, which ranges in size from fine to coarse grain material. Wells that have been drilled in these aquifers indicated depths to groundwater ranging from approximately 70 to 3,000 feet (Welder and McGregory 1966).

Water downstream from the Sweetwater River crossing is used for irrigation, industrial purposes, and municipal supplies (Planning Information Corporation [PIC] 1988a). However, the central and northern portions of the pipeline route traverses groundwater deposits that are high in sodium and have limited suitability for irrigation. The widespread use is for stock and domestic purposes. The Wasatch Formation has the highest potential for water supply use, with yields ranging up to 500 gallons per minute (gpm). The other primary deposits crossed by the pipeline have very limited yields ranging from 0 to 150 gpm.

Groundwater quality along the route is generally poor with dissolved solids frequently exceeding 1,000 milligrams per liter and high sodium and sulfate contents (Hodson et al. 1973).

3.5 Vegetation, Wetlands, Agriculture, and Range Resources

3.5.1 Vegetation and Wetlands

Vegetation types within the project area vary according to soil types, topography, climatic conditions, and grazing and land management practices. The predominant vegetation associations identified in the project area are sagebrush steppe and grama-needlegrass-wheatgrass (Kuchler 1975). A total of four unmodified vegetation types occur along the proposed pipeline route: 1) sagebrush-grass; 2) saltbush-greasewood; 3) juniper woodland; and 4) riparian/wetland. Cultivated cropland also occurs along the proposed route (3.3 miles along the mainline) and is discussed in Section 3.5.3. Table 3-5 lists the vegetation types and associated mileages found along the proposed mainline and lateral routes.

Table 3-5
Vegetation Types Identified Along the Proposed PSC CO₂ Pipeline Project¹

Vegetation Types	Beginning MP	Ending MP	Miles
Mainline Route			
Sagebrush-grass			
	112.47	113.00	0.50
	113.11	113.18	0.07
	113.21	113.53	0.32
	113.62	114.81	1.19
	114.90	115.06	0.16
	115.10	116.17	1.07
	116.22	117.79	1.57
	117.85	119.50	1.65
	119.57	134.30	14.73
	134.40	158.82	24.42
	158.92	168.81	9.89
	169.00	178.90	9.90
	179.00	181.20	2.20
	184.50	200.83	16.33
	201.11	235.90	34.79
	235.94	238.47	2.53
	238.51	242.76	4.25
	242.83	242.97	0.14
	243.03	243.18	0.15
	243.24	243.45	0.21
	243.64	267.10	23.46
	Subtotal		149.56
Saltbush-greasewood			
	168.88	169.00	0.12
	200.83	201.11	0.28
	242.97	243.03	0.06
	Subtotal		0.46
Cropland	181.2	184.45	3.30
Juniper woodland			
	112.40	112.47	0.07
	113.00	113.04	0.04
	113.18	113.21	0.03
	113.53	113.62	0.09
	114.81	114.90	0.09
	115.06	115.10	0.04
	116.17	116.22	0.05
	117.79	117.85	0.06
	158.82	158.92	0.10
	242.76	242.83	0.07
	243.18	242.24	0.06
	243.45	243.64	0.19
	Subtotal		0.89
Riparian/Wetland (all wetland unless otherwise noted)			
	113.04	113.11	0.070
	113.35	--	0.080
	116.25 (riparian)	--	0.002
	116.30 (riparian)	--	0.002
	116.95 (riparian)	--	0.002
	118.90	--	0.002

Table 3-5 (Continued)

Vegetation Types	Beginning MP	Ending MP	Miles
	119.38	--	0.010
	121.03	--	0.007
	124.28 (riparian)	--	0.010
	134.25	--	0.023
	150.10	--	0.001
Riparian/Wetland (continued)	157.90	--	0.015
	157.98	--	0.004
	158.01	--	0.012
	158.30	--	0.004
	159.34	--	0.006
	159.95	--	0.003
	160.80	--	0.002
	162.04	--	0.038
	166.41	--	0.002
	168.90	--	0.004
	171.36	--	0.002
	179.00	--	0.003
	187.60	--	0.002
	189.05	--	0.002
	215.92	--	0.008
	218.29	--	0.002
	221.10	--	0.006
	222.65	--	0.006
	224.73	--	0.004
	225.00	--	0.004
	225.86	--	0.003
	228.21	--	0.009
	230.96	--	0.009
	233.90	--	0.019
	235.84	--	0.049
	238.45	--	0.012
	248.17	--	0.010
	251.60	--	0.007
	253.02 (riparian)	--	0.002
	259.62	--	0.006
Subtotal			0.46
Mainline Total			154.67
Lateral Route			
Sagebrush-grass			
	0.00	0.60	0.60
	0.61	2.24	1.63
	2.26	6.80	4.54
Subtotal			6.77
Riparian/Wetland			
	0.60	0.61	0.01
	2.24	2.26	0.02
Subtotal			0.03
Lateral Total			6.80

¹Because of their relatively small size, wetlands and riparian areas identified along the mainline route were generally only identified as points with an estimated length from 0.001 to 0.01 miles. The total of these lengths was approximately 0.5 mile. Therefore, the total miles of vegetation crossed may vary by approximately 0.5 mile.

Approximately 149.6 miles (97 percent) of the mainline route and 6.77 miles (99.6 percent) of the lateral route would cross sagebrush-grass vegetation type (Table 3-5). Sagebrush-grass vegetation most commonly occurs in valley bottoms, and on plateaus and benches. This vegetation type predominately includes big sagebrush (*Artemisia tridentata*), black sagebrush (*Artemisia nova*), and bud sagebrush (*Picrothamnus desertorum*), as well as antelope bitterbrush (*Purshia tridentata*), and rabbitbrush (*Chrysothamnus* sp.). The major grasses associated with this vegetation type are western wheatgrass (*Pascopyrum smithii*), needlegrass (*Achnatherum* sp.), needle-and-thread (*Stipa comata*), Sandberg bluegrass (*Poa secunda*), threadleaf sedge (*Carex filifolia*), bluebunch wheatgrass (*Pseudoroegneria spicata*), and Indian ricegrass (*Achnatherum hymenoides*). Common forbs include buckwheat (*Erigonum* sp.), bluebells (*Mertensia* sp.), broom snakeweed (*Gutierrezia sarothrae*), and arrowleaf balsam root (*Balsamorhiza sagittata*). Ground cover ranges from 10 to 35 percent (BLM 1985a). The sagebrush-grass vegetation type provides forage for domestic livestock and wildlife and, within the project area, is the vegetation type most commonly used for livestock grazing.

Approximately 0.5 mile (0.3 percent), of the mainline route would cross the saltbush-greasewood vegetation type (Table 3-5). The saltbush-greasewood vegetation type is generally found on terraces associated with drainageways, in level to gently sloping basin areas, and on gently sloping to sloping areas with saline and alkaline soils. Dominant shrub species include Nuttall's saltbush (*Atriplex nuttallii*), shadscale (*Atriplex confertifolia*), fourwing saltbush (*Atriplex canescens*), black sagebrush, big sagebrush, greasewood (*Sarcobatus vermiculatus*), and rabbitbrush. Dominant grass species include Indian ricegrass, western wheatgrass, needle-and-thread, inland saltgrass (*Distichlis spicata*), and alkali sacaton (*Sporobolus airoides*). This vegetation type is used for livestock grazing and wildlife habitat (BLM 1985a).

Approximately 0.9 mile (0.6 percent) of the mainline route would traverse the juniper woodland vegetation type (Table 3-5). The juniper woodland vegetation type occurs on strongly sloping to steep and very steep sideslopes on shallow, rocky soils. The dominant species is Utah juniper (*Juniperus osteosperma*). Common understory species include big sagebrush, rabbitbrush, western wheatgrass, squirreltail (*Elymus elymoides*), broom snakeweed, and Indian ricegrass. This vegetation type is used for livestock grazing and wildlife habitat. Juniper woodland occurs along the proposed route on Green Mountain, adjacent to Horse Creek, and along Pine Ridge.

Based upon review of National Wetland Inventory (NWI) maps and ground and aerial surveys conducted along the route in April and July 2000, approximately 38 wetlands are located along the proposed route (see Appendix B, Table B-1). In addition, five riparian areas are located at MP's 116.25, 116.30, 116.95, 124.28, and 253.02. Five locations that contain both wetland and riparian areas also are located along the route at MP's 119.38, 121.03, 235.84-235.87, 248.17, and 251.60. Eight locations were identified where the proposed route parallels a wetland or

riparian area or other waters of the U.S. within 50 feet for more than 500 feet. These areas occur at MP 118.6-118.8, 121.21, 152.8, 165.05, 192.10-192.5, 232.0, 233.8, and 256.5. A detailed discussion of the surveys and their results is provided in the report, *Summary of Year 2000 Surveys for Wetlands and Other Waters of the U.S. for the Petro Source Carbon Dioxide Pipeline Project*, which is on file at the BLM's Casper, Lander, and Buffalo, Wyoming, Field Offices.

Palustrine emergent and upper intermittent riverine wetlands were the two major types of wetlands identified along the route. The majority of the wetlands were located along major drainages, including the Sweetwater River, Dugout Creek and its tributaries, Salt Creek, and Meadow Creek. Dominant vegetation associated with the majority of the wetlands included sandbar willow (*Salix exigua*), Baltic rush (*Juncus balticus*), alkali grass (*Puccinellia* sp.) prairie cordgrass (*Spartina pectinata*), spikerush (*Eleocharis* sp.), salt cedar (*Tamarix* sp.) and cottonwood (*Populus* sp.) The largest wetland area identified along the route was associated with a series of beaver ponds located at MP 113.35 and consisted of a crossing length of approximately 450 feet. A playa located at MP 189.73, that was identified on NWI maps of the area, was field-checked in January 2001. Based upon the results of the field delineation, no playa occurs at that proposed ROW crossing. No farmed or otherwise modified wetlands were identified as being crossed by the PSC route.

Approximately 169 surface drainage features identified as R4SBA on NWI maps are located along the proposed PSC ROW. R4SBA are defined as intermittent riverine systems with temporarily flooded streambeds. The BLM required aerial confirmation of R4SBA areas identified from NWI maps. These features, which are considered other waters of the U.S., are afforded generally the same protection as those granted to wetlands under the Clean Water Act, although areas with this designation generally do not meet the BLM's guidelines for consideration as wetlands requiring mitigation. Waters of the U.S. include flowing streams, dry channels, and other tributaries to "navigable" waterways, as well as wetlands. A detailed discussion of R4SBA areas, including their locations along the proposed PSC route, is available in the report, *Summary of Year 2000 Surveys for Wetlands and Other Waters of the U.S. for the Petro Source Carbon Dioxide Pipeline Project*, which is on file at the BLM's Casper, Lander, and Buffalo, Wyoming field offices.

Stock ponds or irrigation ditches with associated wetland areas are located along the ROW or lie within 50 feet of the proposed ROW. These locations occur at MP 150.1, 150.28, 172.87, 172.90, 175.8, 178.3, 180.6, 244.63, and 244.67. Generally, the U.S. Army Corps of Engineers (COE) does not consider these types of features jurisdictional wetlands or jurisdictional waters of the U.S.

It should be noted that final regulatory authority for the wetlands identified along the PSC pipeline route lies with the COE and that the COE will provide the final determination and approval of the wetland boundaries.

3.5.2 Noxious Weeds

An increasing concern on both public and private lands is the occurrence and spread of noxious weeds and invader plant species. Typical locations for noxious weed infestations are riparian zones, livestock concentration areas, roads and highways, and disturbed soils.

Noxious weed surveys along the proposed pipeline route were required by the BLM as part of environmental impact evaluations and included those species that are known to occur in the vicinity of the project area, as identified by the local Weed Districts and BLM offices. Noxious weed species surveyed for along the ROW are identified in Table B-3 in Appendix B (Noxious Weed Data).

In July 2000, field surveys were conducted for existing noxious weed populations located along the entire proposed PSC ROW by the Natrona County Weed and Pest District and an ENSR field biologist. The surveys identified noxious weed infestations located within the 200-foot-wide pipeline ROW corridor for both the proposed route and the lateral and were conducted by helicopter on July 11 and 12. Additional incidental information on weed populations also was collected during sensitive plant ground surveys conducted along the ROW in June and July 2000. Results of these aerial and ground surveys have been summarized in Tables B-4 and B-5 in Appendix B. Detailed information on the noxious weed surveys is provided in *Summary of the Year 2000 Surveys for Noxious Weeds for the Petro Source Carbon Dioxide Pipeline Project* on file at the BLM's Casper Field Office.

Based upon the results of both surveys, Canada thistle and Scotch thistle were the most numerous of the noxious weed species identified along the ROW. Fifteen populations of Canada thistle and 12 populations of Scotch thistle were located along the route. In addition, 9 populations of salt cedar, 5 populations of Russian knapweed, 4 populations of both leafy spurge and wild licorice, 2 populations of halogeton, and one population each of mullein, musk thistle, and whitetop also were identified along the route.

Seven of the populations identified on the ground overlap with populations identified during the aerial survey. These include the weed populations identified at MP 150.3, 233.5, 238.5, 238.45 to 239.0, and along Lateral MP 0.5, 1.2, and 6.7.

3.5.3 Agriculture and Range Resources

One cultivated cropland area is located at MP 181.2 to 184.5. This is a dry land cultivated field that is located approximately 2 miles southeast of Powder River, Wyoming. No prime or unique farmland has been identified as being crossed by the route. The pipeline route predominantly

crosses rangeland. The majority of the route would cross private grazing lands and federal and state lands authorized for livestock grazing. BLM has established grazing allotments on federal land that designate parcels where grazing privileges are authorized. Ranching activities in the project area include cow-calf, yearling, and sheep grazing operations.

Grazing capacities in the project area vary based on vegetation types (range sites), landform, slope, and range condition. Grazing capacities in the area range from 5 to 12 acres per animal unit month (AUM) (BLM 1985a). Areas with low carrying capacities occur in lower average annual precipitation zones (less than 9 inches annually). These areas mainly support a cover of sagebrush, greasewood, and saltbush, and an average grazing capacity of 10 to 12 acres per AUM (BLM 1985a). Grasslands in the 9- to 12-inch average annual precipitation zone with loamy soil sites average 8 to 12 acres per AUM.

The proposed route would cross through the Green Mountain Wild Horse Herd Area, located along the ROW between the Crooks Gap area and Highway 287. There are approximately 300 horses in this herd area.

3.5.4 Threatened, Endangered, Candidate, and Sensitive Plant Species

Nine special status plant species were identified as potentially occurring in the project study area (Table 3-6). The following information summarizes known distribution, habitat associations, and survey results for these species. Surveys were conducted in potential habitat (see Table 3-6) along the route and access roads during June 19 through 30 and July 10 through 21, 2000 (Scott and Scott 2000).

Blowout penstemon (*Penstemon haydenii*) is a federal endangered species that is endemic to the Sandhills region of west-central Nebraska. This is a short-lived perennial species that blooms in May and June and occurs in large, multi-stemmed clumps. Blowout penstemon is associated with steep slopes on active sand blowouts with less than 3 percent cover contributed by blowout grass (*Redfieldia flexuosa*), thickspike wildrye (*Elymus lanceolatus*), lemon scurfpea (*Psoralidium lanceolatum*), and rubber rabbitbrush (*Chrysothamnus nauseosus*). This species has been observed on BLM lands in northwestern Carbon County, and additional populations may occur in the sandhills located north of Natrona, Wyoming. No plants were observed along the corridor or access roads.

Another federal endangered plant species that may occur in the project area is Ute ladies'-tresses orchid (*Spiranthes diluvialis*). Ute ladies'-tresses is a perennial terrestrial orchid that is endemic to moist soils near wet meadows, springs, lakes, and perennial streams. This plant generally occurs in small scattered groups in relatively open areas where vegetation is not densely overgrown. Ute

Table 3-6
Special Status Plant Species Potentially Occurring in the
Near the Proposed PSC CO₂ Pipeline Project Study Area

Common Name	Scientific Name	Status	Potential Habitat Areas (MP) ¹	Survey Results ²
Desert yellowhead	<i>Yermo xanthocephalus</i>	PT	120-160	Not present
Ute ladies'-tresses orchid	<i>Spiranthes diluvialis</i>	T	215-267	Not present
Blowout penstemon	<i>Penstemon haydenii</i>	E	112.4-145;188-195	Not present
Colorado butterfly plant	<i>Guara neomexicana</i>	PT	None	Not present
Many-stemmed spider-flower	<i>Cleome multicaulis</i>	PT	130-170	Not present
Porter's sagebrush	<i>Artemisia porteri</i>	SSC	150-180	Population at MP176.7
Cedar Rim thistle	<i>Cirsium aridum</i>	SSC	112.4-180	Not present
Devil's Gate twinpod	<i>Physaria eburniflora</i>	SSC	112.4-165	Not present
Nelson's milkvetch	<i>Astragalus nelsonianus</i>	SSC	112.4-175; 195-200	Population at MP196

¹ Scott (2000).

² Based on soils, geology, vegetation communities, herbarium records, and known distribution records.

Notes: T= Federally Listed as Threatened.

E= Federally Listed as Endangered.

PT = Proposed for federal Listing as Threatened.

SSC = BLM Species of Special Concern.

ladies'-tresses is best identified during the flowering stage, which occurs from mid-July to mid-September. No plants were found along the portions of the route that were surveyed (MP 215 to 267).

Three other plant species of concern, Colorado butterfly plant (*Guara neomexicana*), desert yellowhead (*Yermo xanthocephalus*), and many stemmed spider-flower (*Cleome multicaulis*) are threatened and may occur in the project area. One of these species, Colorado butterfly, is not expected to occur within the project study area, based on its known distributional range (Scott 2000). Suitable habitat locations within the project area are listed in Table 3-6. The many-stemmed spider-flower is found on the semi-moist, open saline banks of shallow ponds, and lakes, along with baltic rush and bulrush. This annual species is mostly found in the Pathfinder National Wildlife Refuge bordering perennial playa lakes with an annual fluctuation in population size. These three species were not observed during surveys within potential habitat along the route.

Four BLM sensitive plant species are known to occur within the project vicinity. Species that may occur along the proposed route include Porter's sagebrush (*Artemisia porteri*), Devil's Gate

twinpod (*Physaria eburniflora*), Nelson's milkvetch (*Astragalus nelsonianus*), and Cedar Rim thistle (*Cirsium aridum*). Porter's sagebrush generally occurs on ashy clay/shale badlands-type outcrops in areas of low vegetative cover. Devil's gate twinpod generally is found on various substrates such as limestone, chalky sandstone, and granite in areas of low plant cover on rims and gravelly ridgetops. Nelson's milkvetch may be found in areas of rocky barrens or stabilized dunes. Cedar Rim thistle is found on hills and slopes with gravelly, rocky, or shaley soils in Fremont and Sublette Counties. Two of the four species were observed during surveys (Scott and Scott 2000). Porter's sagebrush (15 individuals) was observed at MP 176.7. This species also was observed at 13 sites located west of the ROW from MP 175.3 to MP 176.5. Porter's sagebrush is considered to be locally abundant on the badlands of the Wind River Formation located west of the corridor (Scott 2001). Nelson's milkvetch (7 individuals) was present at MP 196. Populations also were observed at seven additional sites, which were located along adjacent roads near MP 196 and between MP 194 and MP 195. This milkvetch species is considered to be common in the area, where it occurs as scattered single plants or small clumps (Scott 2001).

3.6 Wildlife

3.6.1 Recreationally and Economically Important Species and Nongame Wildlife

As discussed in Section 3.5.1, the proposed project would transect four habitat types including sagebrush-steppe, saltbush-greasewood, sand dune-forb-grass, and riparian/wetland. The project area is characterized by flat to low rolling terrain with intermittent terraces, steep slopes, and rocky ridges. Baseline descriptions of both resident and migratory wildlife include species that have either been documented in the project area or those that may occur in the project region based on habitat associations. Wildlife species that would occur within the majority of the proposed project area are typical of the sagebrush-steppe and saltbush-greasewood communities. Species that inhabit riparian/wetland areas are limited to the Sweetwater River, perennial and intermittent drainages, and ponds and marshes that are either crossed by the proposed project or occur in the surrounding uplands. In the following discussions, the proposed project refers to the study corridor for the proposed main and lateral routes.

3.6.1.1 Big Game Species

Big game species that occur in the region of the proposed project include pronghorn, mule deer, elk, and moose (BLM 2000; WGFD 2000). Seasonal ranges considered to be crucial for these four species during the winter months (November 15 to April 30) include habitats that provide adequate forage and thermal cover for over-winter survival and reproduction requirements, particularly during extreme winters. Important elk parturition range that is utilized from May 1 to

Table 3-7
Big Game Crucial Winter and Partuition Ranges Crossed by the Proposed PSC CO₂
Pipeline Route

Species	Habitat Type	Mileposts	Miles Crossed
Pronghorn	Crucial Winter	125.6 – 137.8	12.2
Pronghorn	Crucial Winter	180.4 – 195.9	15.5
Mule Deer	Crucial Winter	136.1 – 136.5	0.4
Mule Deer	Crucial Winter	138.5 – 143.9	5.4
Elk	Crucial Winter	115.4 – 117.5	2.1
Elk	Parturition	115.4 – 117.1	1.7
Moose	Crucial Winter	132.6 – 134.7	2.1

June 30 also occurs in the vicinity of the proposed route. Table 3-7 summarizes the linear miles of big game crucial winter range and elk parturition range crossed by the proposed ROW.

Pronghorn occur throughout the majority of the region crossed by the proposed project. Pronghorn inhabit grasslands and semi-desert shrublands on flat to rolling topography and browse on shrubby plants, especially sagebrush, throughout the year. The proposed route crosses portions of pronghorn winter/yearlong and yearlong ranges. During the winter, pronghorn generally utilize areas of relatively high sagebrush densities and overall low snow accumulations, on south- and west-facing slopes. Crucial winter range for this species occurs along 27.7 miles of the proposed ROW (Table 3-7).

Mule deer also occur throughout the majority of the region associated with the proposed project, inhabiting virtually all vegetation types. Mule deer feed on a wide variety of plants including forbs, grasses, sedges, shrubs, and trees. The proposed route crosses portions of mule deer winter/yearlong and yearlong ranges. Like the pronghorn, winter habitat for the mule deer occurs in areas of relatively high sagebrush densities and overall low snow accumulation, on south- and west-facing slopes. Crucial winter range for this species occurs along 5.8 miles of the proposed ROW (Table 3-7).

Elk occur in a variety of habitats in the project region including coniferous forests, aspen, shrublands, grasslands, and agricultural areas. The proposed route crosses portions of elk winter/yearlong and yearlong ranges in the Green Mountain area. Crucial winter range for this species occurs in the Green Mountain area, along 2.1 miles of the proposed ROW. Elk parturition range also occurs in the Green Mountain area, coinciding with crucial winter range along 1.7 miles of the proposed ROW (Table 3-7).

Moose typically occupy forested riparian areas that provide browse habitat in fall and winter and aquatic vegetation during the summer. The Sweetwater River drainage is considered to be winter/yearlong and crucial winter range for this species. Moose crucial winter range occurs along 2.1 miles of the proposed ROW (Table 3-7).

3.6.1.2 Small Game Species

Important upland game species that occur within the project area include sage grouse, chukar, gray (Hungarian) partridge, and mourning dove. Sage grouse are considered the most sensitive upland game bird for the region, based on the species' requirements for breeding, nesting, and brooding habitat. Due to this species' sensitivity and declining populations, sage grouse may be petitioned for federal listing in 2001. Sage grouse typically occupy sagebrush communities, breeding in relatively open lek sites (or strutting grounds), and often nesting and brooding in upland areas and meadows in proximity to water. Large expanses of sagebrush occur in central Wyoming that support both breeding and wintering sage grouse.

Surveys for active sage grouse leks were conducted along the proposed project ROW, known secondary access roads, and TUAs using both aerial and ground inventory procedures. The aerial surveys (March 23 to 28, 2000) were used to: 1) determine occupancy of all known historic lek sites within 2 miles from the outside edge of the proposed ROW, known access roads, and TUAs', and 2) locate any new lek sites within 0.5 mile from the outside edge of the proposed ROW. Follow-up ground surveys for sage grouse leks were conducted within 2 miles of the proposed ROW from April 2 to 12, 2000. The purpose of the ground surveys was to verify the status of: 1) historic leks not found to be active during aerial surveys; 2) new lek sites identified during aerial surveys; and 3) areas where individual sage grouse or a number of sage grouse were recorded during the aerial surveys, but breeding displays were not observed. Ground surveys were separated into two survey components, early morning and day-time surveys.

Early morning surveys were conducted in areas up to 2 miles from the proposed ROW and known access roads, where breeding activity could not be verified from the aerial surveys. This included historic leks known to be active within the past 5 years but not found to be active during aerial surveys, new potential lek sites not verified during aerial surveys, and "suspect" areas where individual grouse or a number of grouse were recorded during the aerial surveys, but breeding displays were not observed. Day-time surveys were conducted at those historic lek sites not known to be active within the past 5 years and not found to be active during aerial surveys, and at new confirmed lek sites observed during aerial surveys, located up to 2 miles from the proposed ROW.

A total of 29 historic and 9 newly discovered lek sites were identified within 2 miles of the proposed ROW, known access roads, and TUAs. Of these 29 leks, 4 historic leks and 9 newly discovered leks were found to be active during the 2000 aerial and ground surveys. Six of the active leks were located within 0.25 mile from the proposed ROW. Of these six lek sites, three (31-87-13-01-N, 36-83-13-01-N, and 36-83-13-02-N) were found to be active during the survey period and three (34-85-34-01-H, 34-85-34-02-H, and 43-78-34-01-H) were inactive during the survey period. In addition, seven active leks were located between 0.25 and 2.0 miles from the proposed ROW (ENSR 2000a). A total of 37 miles of nesting habitat associated with the 13 active leks would be crossed by the proposed project. Detailed survey summaries and U.S. Geological Survey (USGS) 7.5-minute topographic maps showing historic and new lek sites in the project area have been submitted to the BLM's Lander, Casper, and Buffalo Field Offices.

Chukar and mourning dove use a variety of habitats. Chukar occur in dry sagebrush, grasslands, and deserts, often along rocky slopes, mesic areas, and rugged canyons (Terres 1991). Chukar populations are known to occur in portions of central Wyoming associated with the proposed project. Mourning dove occur in habitats ranging from deciduous forests to shrubland and grassland communities, often nesting in trees or shrubs near riparian areas or water sources. Mourning dove occur throughout the region associated with the proposed project. Gray (Hungarian) partridge are associated with grasslands, shrublands, and agricultural areas and are considered widespread but not common in the northern portions of the project region.

Numerous species of waterfowl nest and migrate through the region. Key yearlong waterfowl residents include Canada goose, mallard, green-winged teal, northern pintail, gadwall, and American widgeon. Other common summer residents include blue-winged teal, cinnamon teal, northern shoveler, redhead, and ring-necked duck (WGFD 1997).

3.6.1.3 Nongame Species

Common predatory mammal species that occur within habitats that would be crossed by the proposed route include coyote, red fox, raccoon, long-tailed weasel, badger, striped skunk, and bobcat. Representative small mammals that occur within the proposed project area include desert cottontail, white-tailed jackrabbit, least chipmunk, white-tailed prairie dog, black-tailed prairie dog, northern pocket gopher, Ord's kangaroo rat, deer mouse, and beaver (WGFD 1997). A number of bat species also occur within the project region including long-legged myotis, little brown myotis, big brown bat, pallid bat, and western small-footed myotis.

Amphibians and reptiles occupying the region are typically limited by their specific habitat requirements. Key species that could potentially occur within the proposed project area include

the tiger salamander, eastern short-horned lizard, northern sagebrush lizard, and prairie rattlesnake (WGFD 1997).

A variety of passerines (i.e., perching birds) occur within the project region throughout the year; however, they are most abundant during migration and the breeding season. Representative bird species that occur in the project region include Say's phoebe, horned lark, barn swallow, black-billed magpie, American crow, western meadowlark, sage thrasher, and European starling (WGFD 1997). Migratory passerines and raptors are protected under the Migratory Bird Treaty Act (Federal Register 2001).

Raptor species that could potentially occur as residents or migrants within the region include eagles (bald and golden eagles), buteos (e.g., red-tailed hawk, Swainson's hawk, ferruginous hawk), falcons (e.g., peregrine falcon, prairie falcon, American kestrel), accipiters (e.g., northern goshawk, Cooper's hawk, sharp-shinned hawk), owls (e.g., great-horned owl, burrowing owl, long-eared owl, short-eared owl), northern harrier, and turkey vulture. Breeding raptor surveys were conducted along the proposed ROW, known secondary access roads, and TUAs using both aerial and ground inventory procedures. The aerial raptor surveys were conducted on April 27 and 28, 2000, to identify occupied territories or active nest sites located within 0.75 mile from the outside edge of the proposed ROW boundary. Aerial surveys focused on cliff nesters (e.g., golden eagle, falcon species), species that commonly build nests on deciduous trees or on promontory points (e.g., red-tailed hawk, Swainson's hawk, ferruginous hawk, great-horned owl), and ground nesters (e.g., ferruginous hawk, northern harrier). The aerial surveys did not concentrate on cavity nesters (e.g., American kestrel), sub-terranean nesters (e.g., burrowing owl), or most conifer nesters (e.g., accipiters), based on visibility limitations from the helicopter. Additional ground surveys were conducted from May 3 to 5, 2000, at those nest sites where either breeding status could not be determined or in areas that were identified as potentially supporting nesting birds during the aerial surveys.

Based on the results of the year 2000 breeding raptor surveys, 91 nest sites and 3 occupied breeding territories were identified within 0.75 mile of the proposed ROW, known access roads, and TUAs. Of these 91 nest sites, 14 were active, 73 were inactive, and 4 were of unknown status (ENSR 2000b). Three additional breeding territories and/or defended nest sites (red-tailed hawks and Swainson's hawk) also were recorded. The active nest sites were occupied by golden eagles (5), red-tailed hawks (6), ferruginous hawks (2), and great horned owl (1). Detailed survey summaries and USGS 7.5-minute topographic maps showing historic and new nest sites, and occupied breeding territories in the project area have been submitted to the BLM's Lander, Casper, and Buffalo Field Offices.

3.6.2 Threatened, Endangered, Candidate, and Sensitive Wildlife Species

A number of terrestrial special status species including federally listed, federally proposed, and federal candidate; and BLM and state sensitive species were identified for the project area (Oberlie 2001; USFWS 2000; Wyoming Natural Diversity Database [WYNDD] 2000). The potential occurrence of special status species within the project area was based on range, known distribution, and the presence of potentially suitable habitat crossed by the proposed route. In accordance with Section 7 of the Endangered Species Act, the BLM initiated informal Section 7 consultation with the USFWS for the project. The federally listed, proposed, and candidate wildlife species identified for this project are presented in Table 3-8.

Table 3-8
Special Status Wildlife Species Identified for the Proposed
Petro Source CO₂ Pipeline Project

Common Name	Scientific Name	Status
MAMMALS		
Black-footed ferret	<i>Mustela nigripes</i>	Endangered
Black-tailed prairie dog	<i>Cynomys ludovicianus</i>	Candidate
BIRDS		
Bald eagle	<i>Haliaeetus leucocephalus</i>	Threatened ¹
Mountain plover	<i>Charadrius montanus</i>	Proposed

¹The species has been proposed for delisting by the USFWS; the final rule on the decision is pending.

3.6.2.1 Mammals

Black-Footed Ferret

The black-footed ferret (*Mustela nigripes*) is federally listed as endangered and is currently designated as a Wyoming Species of Special Concern (SSC). Black-footed ferrets are considered obligate associates to prairie dogs, which constitute their primary food source and provide burrows for shelter. Although the proposed project occurs within the historic range of the black-footed ferret, this species is presently restricted to reintroduced populations in Montana, South Dakota, Utah, Arizona, and Carbon County in Wyoming; however, remnant ferret populations may exist in portions of its former range (Hillman and Carpenter 1980).

Potentially suitable habitat for ferrets is determined by the size and density of active prairie dog colonies. It is assumed that all colonies crossed by the project ROW are associated with larger

complexes; therefore, the number of acres does not apply, and whether these colonies meet the applicable USFWS' 1989 ferret guidelines would be limited to activity levels and relative burrow density. Two species of prairie dog, white-tailed and black-tailed, occur in the project area. A total of 4 white-tailed prairie dog colonies would be crossed by the proposed project ROW, based on the spring 2000 aerial surveys and data provided by the BLM. All four of these colonies meet the USFWS 1989 guidelines for ferrets (i.e., active colonies with a minimum of 8 burrows per acre) (USFWS 1989). In addition, 8 black-tailed prairie dog colonies also would be crossed by the ROW. Although only one of the 12 prairie dog colonies that would be crossed by the ROW has been confirmed to be the black-tailed species, it is assumed that all prairie dog colonies that occur north of MP 220 support the black-tailed prairie dog. This assumption is based on the historical distribution of the two prairie dog species in the project region and the appearance of the eight colonies that occur north of MP 220. Of the eight black-tailed prairie dog colonies crossed by the ROW, only one has been confirmed as meeting the USFWS' guidelines established for the black-footed ferret. The status of the remaining seven colonies is unknown.

In addition, nine colonies were historically recorded by the WGFD prior to 1988, but were not observed during the spring 2000 surveys. It is assumed that these nine colonies were either historically mismapped (i.e., no global positioning system coverage), are currently inactive, or were not readily apparent during the spring 2000 surveys. Given the recent survey results, these nine colonies were eliminated from further analysis.

Black-tailed Prairie Dog

The black-tailed prairie dog (*Cynomys ludovicianus*) was recently classified as a federal candidate species. It also is designated as a Wyoming SSC. In Wyoming, the historical range of this species included much of eastern Wyoming and the Bighorn Basin (WGFD 1996). The current distribution of this species is similar to the historic range and includes mountain-foothills and shrublands along the southern end of the Bighorn Mountains as a habitat link between the eastern grasslands and the Bighorn Basin. Black-tailed prairie dogs inhabit shortgrass prairie and mixed grasslands that contain suitable upland soil types for constructing extensive burrow systems.

Aerial and ground black-tailed prairie dog surveys were conducted from March 23 to 28, and April 2 to 11, 2000, respectively, to determine location, size, and density of active colonies. As stated above, the proposed ROW would cross 8 black-tailed prairie dog colonies. However, the status of 7 of these colonies is unknown. All of the black-tailed prairie dog colonies that occur within the project area are assumed to be part of the larger midwest black-tailed prairie dog complex.

Swift Fox

The swift fox (*Vulpes velox*), a BLM sensitive species and a Wyoming SSC, was removed from the USFWS candidate list on January 8, 2001. The swift fox was once distributed throughout the prairie regions from southern Canada, south through the Great Plains of the United States (WGFD 1996). Currently, this species exists in several highly disjunct populations in small portions of its historic range. Swift fox habitat is composed of level to gently sloping topography (<15 percent slope) containing an open view of the surrounding landscape, abundant prey, and lack of predators and competitors (USFWS 1994). In Wyoming, this species occurs in the eastern one-quarter of the state and inhabits short- and mid-grass prairies, often using highways and railroad ROWs for denning, and cultivated fields, old corrals, and buildings for foraging (WGFD 1996).

Few observations of swift fox have been reported in the vicinity of the proposed route, specifically in Natrona County (Woolley et al. 1995). However the majority of the reported observations for this species are in eastern Wyoming (Oberlie 1999a). Many of these observations have been reported in habitats considered to be atypical for this species (e.g., greasewood) (Oberlie 1999a). Although the swift fox could potentially occur within the project area, the potential for occurrence is low.

3.6.2.2 Birds

Bald Eagle

The bald eagle (*Haliaeetus leucocephalus*) is federally listed as threatened and is protected under the Bald Eagle Protection Act. This species was proposed to be delisted by the USFWS on July 6, 1999; the final rule on this decision is pending. Additionally, this species is designated as a Wyoming SSC. Most nesting bald eagles in Wyoming occur in the greater Yellowstone area, including Teton County, Grand Teton National Park, and Yellowstone National Park. However, additional pairs of eagles currently occur in Carbon County (WGFD 1996). No historic or current nest sites have been documented within or adjacent to the proposed project ROW (BLM 2000). The aerial surveys conducted for breeding raptors (April 27 and 28, 2000) examined potential bald eagle suitable nesting habitat (e.g., Sweetwater River) up to 1 mile on either side of the ROW. No individual bald eagles or bald eagle nest sites were found during the raptor surveys. No winter concentration areas have been recorded within or adjacent to the proposed project ROW (BLM 2000); however, individual bald eagles have been observed using the Sweetwater River corridor during the winter (Oberlie 1999b). No historic or active communal roost sites, winter roosts, or winter concentration areas have been identified within 2 miles of the proposed route (BLM 2000).

Two historic bald eagle winter roost site areas occur from approximately 2 to 5 miles from the proposed route in the Pine Mountain area (BLM 2000).

Mountain Plover

The mountain plover (*Charadrius montanus*) is currently proposed to be federally listed as threatened; the final rule by the USFWS is pending. Additionally, this species is designated as a Wyoming SSC. The historic breeding range of the mountain plover included short-grass prairies from extreme southern Canada, south through the Great Plains of the United States. Currently, mountain plovers only nest in isolated areas throughout their range (WGFD 1996). In Wyoming, the breeding range of this species is widespread and relatively common in favored habitat; however, population levels and trends are not known (WGFD 1996). Breeding habitat for this species appears to vary geographically. However, throughout its range suitable breeding habitat is characterized primarily by shortgrass prairie grassland where grazing is intensive, or in areas of fallow fields or active prairie dog towns (Knopf 1999). In addition, breeding plovers also have been documented on well drill pads (USFWS 1999). Areas of flat bare ground appear to be the most prominent characteristic of suitable breeding habitat for plovers (Knopf 1999). In Wyoming, mountain plovers have been documented in areas of low (less than 4-inches tall) vegetation with little to no topography, shortgrass prairies, low shrubs, and on dry mudflats (Parrish et al. 1993). No historic nest sites were identified within 0.25 mile of the proposed ROW. However, based on its known distribution, documented observations within the project region (WGFD 1997), and Wyoming Gap analysis data, mountain plovers could potentially occur within the project area.

Burrowing Owl

The burrowing owl (*Athene cunicularia*) is designated as a BLM sensitive species. This species breeds from south-central British Columbia, south through most of the western United States, to Central and South America. Population declines over the past century have been primarily due to habitat loss, habitat fragmentation, and pesticide poisoning (Jones 1998). The burrowing owl typically inhabits level, open areas in heavily grazed or low-stature desert vegetation, with available burrows for nesting and cover (Johnsgard 1988). Nesting habitat consists of abandoned mammal burrows on flat, dry, and relatively open terrain (Johnsgard 1988). To date, one historic nest site has been identified within 0.1 mile of the project ROW (ENSR 2000b). However, based on the habitats that would be crossed by the project ROW, additional burrowing owl nest sites could occur in the vicinity of the proposed project ROW.

3.6.2.3 Other Sensitive Species

A number of other sensitive animal species were identified for the proposed project based on information provided by the BLM (Oberlie 2001; WYNDD 2000). Their potential occurrence in the project area was based on range, known distribution, and potentially suitable habitat crossed by the proposed project route.

A number of sensitive small mammal species could occur within the project area including long-eared myotis (*Myotis evotis*), fringed myotis (*Myotis thysanodes*), spotted bat (*Euderma maculatum*), and Townsend's big-eared bat (*Corynorhinus townsendii*). One known Townsend's big-eared bat hibernacula roost has been identified approximately 2 miles from the project ROW in Natrona County (VanFleet 2000; WYNDD 2000). Also, as discussed in Section 3.6.2.1, 4 white-tailed prairie dog (*Cynomys leucurus*) colonies would be crossed by the proposed ROW.

Sensitive bird species that utilize riparian/wetland habitats in the project region include birds such as the common loon (*Gavia immer*), white-faced ibis (*Plegadis chihi*), American bittern (*Botarus lentiginosus*), and Wilson's phalarope (*Phalaropus tricolor*), and amphibians such as the northern leopard frog (*Rana pipiens*), Great Basin spadefoot (*Spea intermontana*), boreal toad (*Bufo boreas boreas*), and the spotted frog (*Rana pretiosa*).

Upland bird species, including merlin (*Falco columbarius*), sage thrasher (*Oreoscoptes montanus*), loggerhead shrike (*Lanius ludovicianus*), Brewer's sparrow (*Spizella breweri*), sage sparrow (*Amphispiza billineata*), Baird's sparrow (*Ammodramus bairdii*), and McCown's longspur (*Calcarius mccownii*), also could be present in shrubland and grassland habitats crossed by the proposed route.

3.7 Aquatic Resources

Of the 11 perennial streams crossed by the proposed PSC pipeline route, six contain recreational game fish species. Two additional streams (Cooper and Horse Creeks) are intermittent at the proposed crossings, but they support game fish in perennial reaches or downstream areas. Table 3-9 provides a listing of recreational fisheries crossed by the pipeline. The pipeline would cross the Sweetwater River in a reach designated as Class IV approximately 1 or 2 miles downstream from the Class III reach. The proposed pipeline would cross one stream (East Cottonwood Creek), that is classified as trout waters of regional importance (Class III), (WGFD 1987). However, this stream is intermittent in the area of the proposed crossing. The pipeline would cross four other streams that are classified as low production trout fisheries (Class IV), incapable of sustaining substantial fishing pressure (Table 3-9). No other recreational fisheries

Table 3-9
Recreational Fisheries Crossed by the Proposed PSC CO₂ Pipeline

Stream	Species	Fishery Classification¹	Milepost
Sheep Creek	Brook Trout	IV	116.1
West Cottonwood Creek	Brook Trout	IV	119.5
Middle Cottonwood Creek	Brook Trout	IV	121.2
East Cottonwood Creek	Brook Trout	III	124.3
Sweetwater River	Brown, Rainbow Trout	IV	134.3
Dry Creek	Brook Trout	IV	150.3

¹ Class I - Premium trout waters - fisheries of national importance.

Class II - Very good trout waters - fisheries of statewide importance.

Class III - Important trout waters - fisheries of regional importance.

Class IV - Low production trout waters - fisheries of local importance, incapable of sustaining substantial fishing pressure.

Note: Intermittent sections of Horse Creek and Cooper Creek would be crossed by the pipeline. These streams support trout species in perennial reach located upstream of the crossing in Cooper Creek (cutthroat) or downstream of the crossing in Horse Creek (brown, rainbow, cutthroat).

Source: WGFD 1987.

would be crossed by the proposed route. Fisheries information is summarized for the perennial streams to be crossed by the pipeline.

3.7.1 Sweetwater River

In the Class IV section of the Sweetwater River, game fish species consist of brown trout and rainbow trout. Trout production is relatively low, as indicated by total catches of 1 to 2 trout/300-foot sampling reach (Dufek 1996). Nongame species collected in this section of the river included white sucker, longnose sucker, creek chub, lake chub, longnose dace, and carp. Habitat at the proposed crossing consists of pools and runs, with depths ranging from less than 0.5 to 4 feet in March 2000. Depth and undercut banks provide cover for fish.

3.7.2 Sheep Creek

This tributary to Crooks Creek supports brook trout in the middle and lower sections of the stream. At the proposed crossing, shallow depths and low flows limit trout habitat.

3.7.3 Cottonwood Creek Tributaries and Dry Creek

West Cottonwood, Middle Cottonwood, East Cottonwood, and Dry creeks support brook trout. The lower portion of Middle Cottonwood Creek near its confluence with the Sweetwater River also occasionally supports brown, rainbow, and cutthroat trout. Nongame species potentially found in these streams include longnose sucker, white sucker, shiners, creek chub, and longnose dace (Dufek 1996). The lower portion of Dry Creek near Pathfinder Reservoir also contains other trout species such as rainbow trout, brown trout, and Snake River cutthroat trout.

3.7.4 Cooper and Horse Creeks

Cooper and Horse creeks contain trout species in perennial reaches located either upstream or downstream of the proposed crossing. Cutthroat trout occur in Cooper Creek, with the closest perennial reach being approximately 2 to 3 miles upstream of the proposed crossing. Horse Creek supports rainbow, brown, and cutthroat trout in a perennial reach located approximately 1 mile downstream of the proposed crossing.

3.7.5 Poison Spider, Coyote, Middle Fork Casper, and Salt Creeks

Fisheries in these streams are composed of nongame native and introduced species (Wolff 2000). Species potentially occurring in these streams include fathead minnow, plains killifish, longnose dace, shiners, and white sucker.

3.7.6 Threatened, Endangered, and Sensitive Species

Four Special Status 3 fish species potentially occur in two of the perennial streams crossed by the pipeline. A Special Status 3 species is defined as a population that is widely distributed throughout its native range and appears stable; however, its habitats are declining or vulnerable. Lake chub and mountain sucker potentially occur in the Sweetwater River (Wolff 2000). Plains minnow and flathead chub potentially are present in Salt Creek.

3.8 Land Use and Recreation

3.8.1 Land Use

Existing land use along the proposed pipeline consists primarily of livestock grazing, wildlife habitat, open space, and dispersed recreation. Existing pipelines and utilities also are located in the project area. The proposed route would parallel other pipelines, electric power distribution lines, and roads for approximately 43 miles, or 27 percent of the total pipeline length.

The proposed pipeline would traverse lands under the regulatory and management control of the BLM, the State of Wyoming, and private land, which is regulated by county land use plans and ordinances. Approximately 57 percent (93 miles) of the pipeline would cross federal lands, 38 percent (62 miles) would cross private lands, and 5 percent (7 miles) would cross state lands.

The lands under the regulatory and management control of the BLM include portions of the Lander Field Office Area, the Casper Field Office Area (formerly the Platte River Resource Area), and the Buffalo Field Office Area. The management of public lands and resources in the Lander Field Office Area is directed and guided by the BLM's Final RMP/EIS (BLM 1986b) and the Record of Decision for the Lander RMP (BLM 1987b). The Lander Field Office Area has been divided into 13 management units, including WSAs. The proposed pipeline would cross portions of three management units including the Green Mountain, Beaver Creek, and Gas Hills Management Units. The WSAs are discussed in Section 3.10. BLM lands within the Green Mountain Management Unit are open for the location of utility and transportation systems. These systems are required to be concentrated in existing utility corridors whenever possible. Approximately 2.4 miles of the proposed route (MP 115.7 to MP 118.1) within the Green Mountain Management Unit would cross a designated ACEC. This ACEC includes the crucial elk winter range.

BLM lands within the Beaver Creek Management Unit are open for the construction of major utility systems except for three designated areas: the Oregon/Mormon Pioneer Trail Corridor, the Sweetwater Canyon, and the Sweetwater Rocks (BLM 1986b). ROWs may be granted within these three high-resource value areas, if no feasible alternative route or designated corridor is available. The BLM encourages utility systems to be concentrated in existing corridors whenever possible (BLM 1986b). Approximately 7,000 acres of federal land within the Beaver Creek Management Unit are within a designated ACEC. This ACEC designation provides management emphasis to protect significant sites and segments along the Oregon/Mormon Pioneer Trail (e.g., ruts, swales, graves, campsites, and pristine settings) (BLM 1986b). The proposed route would not cross the Oregon/Mormon Pioneer Trail in the Beaver Creek Management Unit.

Major utilities are allowed in the Gas Hills Management Unit, except for along the Oregon/Mormon Pioneer Trail corridor and the Sweetwater Rocks. ROWs for major utility systems may be granted if no feasible alternative route or designated ROW corridor is available. Utility systems are required to be concentrated in existing corridors whenever possible (BLM 1986b). Significant sites and segments along the Oregon/Mormon Pioneer Trail (e.g., ruts, swales, graves, campsites, and pristine settings) are designated ACECs (BLM 1986b). The proposed route would cross the Oregon/Mormon Pioneer Trail at MPs 132.0, 132.2, and 132.3 (BLM 1985a).

The management of public lands and resources in the Casper Field Office Area is directed and guided by the Record of Decision for the Platte River RMP/Final EIS (BLM 1985b). The Casper Field Office Area has been divided into 14 resource management units (RMU). The proposed pipeline would cross portions of 3 RMUs including the Pine Mountain and Goldeneye Reservoir, Salt Creek, and Remaining Platte River Resource Area Management Units (BLM 1984a).

One corridor is designated along U.S. Highway 20/26 to accommodate major ROWs within the Pine Mountain-Goldeneye Reservoir RMU (BLM 1985b). Approximately 3.1 miles (MP 185.3 to MP 188.4) of the proposed route would be located in the general corridor along U.S. Highway 20/26. There are no designated ACECs within the Pine Mountain-Goldeneye Reservoir RMU (BLM 1984a).

In the Salt Creek RMU, corridors are designated for major ROW placement along Wyoming Highway 259/U.S. 87 and Wyoming Highway 387 (BLM 1985b). The proposed route is not located within a designated corridor. Approximately 2.5 miles of the proposed route would cross the Salt Creek ACEC, which is managed to protect sensitive, highly erodible soil, water, and air resources (BLM 1985b).

The remaining Platte River Resource Area RMU comprises all lands in the Casper Field Office Area not included in the other 13 RMUs. Five corridors are designated in the RMU, three of which are mentioned above. The remaining two include the Oregon Trail and Poison Spider Road (BLM 1985b). The proposed pipeline is located within a short segment (3.1 miles) of the general corridor along U.S. Highway 20/26. The Platte River Resource Area RMP places the following restrictions on proposed ROWs outside designated corridors:

- Placement would be adjacent to existing facilities or disturbances.
- Cross-country ROW placement would be allowed only when placement in a designated corridor or adjacent to an existing facility is not practical or feasible.
- New corridors would be designated only when placement as indicated above is not practical and when the environmental impacts can be adequately mitigated (BLM 1985b).

The management of public lands and resources in the Buffalo Field Office Area is directed and guided by the Record of Decision for the RMP/Final EIS (BLM 1985c). The Buffalo Field Office Area was not divided into separate management units in the RMP. The Buffalo Field Office Area's management policy is to locate transmission and transportation facilities within designated corridor areas (BLM 1985c). There are several designated corridors within the Field Office Area. The proposed pipeline route is not located within any of the designated corridors. The Buffalo

Field Office Area RMP places the following restrictions on future corridor adjustments and new corridor designations: all corridor adjustments and new designations will be made only when facility placement within an existing designated corridor is incompatible or unfeasible and when the environmental consequences can be adequately mitigated (BLM 1985c). There are no designated ACECs within the Buffalo Field Office Area (BLM 1985c).

3.8.2 Recreation

Recreation resources are areas for the enjoyment and relaxation of both residents and visitors. These areas include lands formally managed for recreation purposes such as recreation sites or parks and other areas where no facilities are provided such as sightseeing, hiking, rock climbing, hunting, fishing, or ORV use areas. Recreation resources can be further categorized as non-urban or dispersed resources such as rural parks, campgrounds, rivers, or undeveloped open lands, and urban-oriented developed resources such as parks and recreation facilities within the boundaries of cities and towns.

The primary urban resources in the project area occur in the communities and cities of Casper, Midwest, Lander, Rawlins, Natrona, Edgerton, Kaycee, and Powder River. Casper is the largest municipality and is centrally located along the proposed pipeline. Therefore, it is likely that the majority of pipeline workers would reside there. Camping by project construction workers and their families could occur in areas where other housing is not readily available or where workers would otherwise prefer to camp. Details regarding housing availability, including recreational vehicle (RV) sites and campgrounds, are provided in Section 3.11.

Non-urban recreation resources in the project area are primarily available on public lands managed by the BLM. Most of the recreational use on public land in the Lander Field Office Area is widely dispersed. Visitors generally participate in a wide variety of recreational activities, including picnicking, hunting, camping, winter sports, and fishing (BLM 1986b). There are three Recreation Management Areas (RMAs) in the project area, including the Oregon/Mormon Pioneer National Historic Trail, the Green Mountain area, and the Sweetwater Rocks WSAs (more details regarding WSAs can be found in Section 3.10). There are two developed recreation areas in the project area, including the Split Rock Interpretive Site and Cottonwood Campground, located in the Green Mountain area (BLM 1986b). The proposed route crosses areas that are designated open for ORV use or limited to existing roads and trails (BLM 1986b).

Recreation in the Sweetwater Rocks area includes hiking, rock-climbing, and camping. This area is used by the National Outdoor Leadership School based in Lander, to conduct courses in rock-climbing, wilderness leadership, and outdoor education.

The proposed route does not cross any RMAs or developed recreation areas in the Casper Field Office Area (BLM 1984a, 1985b). The Goldeneye Wildlife and Recreation Area is approximately 5.5 miles southeast of the proposed route (BLM 1984a). ORV use in the project area is limited to existing roads and vehicle routes; however, temporary ORV use is allowed for performance of necessary tasks (BLM 1985b).

The proposed route does not cross any RMAs or developed recreation areas in the Buffalo Field Office Area (BLM 1984b, 1985c). ORV use in the project area is either open or limited to designated roads (BLM 1984b, 1985c).

Big game hunting occurs throughout the project area and is regulated by the WGFD. In the Lander Field Office Area, licenses to hunt elk and mule deer in the Green Mountain area are highly sought after, and the Sweetwater Rocks area also is popular for mule deer, elk, and antelope hunting. Mule deer and antelope hunting also occurs in the project area between Wyoming Highway 20/26 and I-25 (MP 188 to 228). In the BLM Casper Field Office Area, elk hunting occurs along the portion of the route between Dry Creek Road and Poison Spider Creek (MP 151 to 169).

3.9 Wilderness

There are no designated wilderness areas within 10 miles of the proposed pipeline. However, there are four WSAs within 10 miles of the proposed pipeline: Two of these (Split Rock WSA and Miller Springs WSA) actually touch the pipeline ROW. Collectively, these four WSAs are referred to as the Sweetwater Rocks WSAs and are located in the BLM's Lander Field Office Area. The BLM has studied these areas and analyzed the effects on present or potential resource uses that would result from wilderness designation or nondesignation. The results of this analysis are reported in the Lander Final Wilderness EIS (BLM 1990). The Wilderness EIS was prepared in response to Section 603 of the Federal Land Policy and Management Act of 1976 (FLPMA).

The Lankin Dome WSA (WY-030-120) is located approximately 5 miles north/northwest of the proposed pipeline. The unit has 6,316 acres of contiguous public land and offers outstanding opportunities for a primitive and unconfined type of recreation, including rock climbing, hiking, backpacking, and hunting. The opportunity for solitude exists, but it is not outstanding since the area that provides topographic and vegetative screening to the visitor is small and would be somewhat confining (BLM 1990). Lankin Dome, the most prominent feature of the unit, has long been an attraction to rock climbers (BLM 1990). The area is exceptionally scenic, with the reddish granite boulders, slabs, and exfoliating domes contrasting significantly with the greens of the wooded pockets (BLM 1990). The BLM has recommended the entire 6,316 acres of the Lankin Dome WSA for nonwilderness designation (BLM 1990).

The Split Rock WSA (WY-030-122) is located less than 0.25 mile west of the proposed pipeline. This WSA has 12,789 acres of contiguous public land with one inholding, a 40-acre parcel of private land; the private parcel was not included in the total acreage computation. The unit provides a variety of opportunities for primitive, unconfined recreation, including backpacking, hiking, and camping. For the most part, the WSA is in natural condition, free of human works. Split Rock, a historic landmark, is in the WSA, as it is part of the Oregon Trail corridor on the Sweetwater River (BLM 1990). The BLM has recommended the entire 12,789 acres of the Split Rock WSA for nonwilderness designation (BLM 1990).

The Miller Springs WSA (WY-030-123b) is located less than 0.25 mile southeast of the proposed pipeline. The WSA has 6,429 acres of public land. The unit provides outstanding opportunities for a primitive, unconfined type of recreation, including hiking, camping, rock climbing and hunting. There are opportunities to study geological and scenic attributes in this WSA. It also contains historic and archaeological sites (BLM 1990). The opportunity for solitude in this WSA is limited (BLM 1990). The BLM has recommended the entire 6,429 acres of the Miller Springs WSA for nonwilderness designation (BLM 1990).

The proposed pipeline route would be located between the Split Rock WSA and Miller Springs WSA. Three additional pipelines are located within this narrow corridor, which is depicted in Figure 3-1.

The Savage Peak WSA (WY-030-123a) is located approximately 3 miles southeast of the proposed pipeline. The 7,041-acre unit is concentrated in one block in the immediate vicinity of Savage Peak. The size of the area contributes to the feeling of solitude. This WSA offers a variety of opportunities for primitive and unconfined types of recreation, including hiking, camping, backpacking, hunting, rock climbing, nature study, and photography. Large expanses of bare granite are not found elsewhere in central Wyoming. This WSA, as well as the other three mentioned above, form a natural and highly scenic backdrop for the Sweetwater River Valley and the Oregon, California, Mormon Pioneer, and Pony Express National Historic Trail Corridors (BLM 1990). The BLM has recommended the entire 7,041 acres of the Savage Peak WSA for nonwilderness designation (BLM 1990).

The FLPMA directed the Secretary of the Interior to report his recommendations for wilderness or non-wilderness designation to the President on October 21, 1991. The President sent his recommendations to Congress in 1993. The Congress has not acted on these recommendations and is under no time limit to do so. Guidance and policies for managing these areas are provided in BLM Handbook H-8550-1, *Interim Management Policy for Lands Under Wilderness Review*. Until Congress acts on the President's recommendations, the Secretary is required to manage such lands under the *Interim Management Policy and Guidelines for Lands Under Wilderness*

Review so as not to impair their suitability for preservation of wilderness, subject to certain exceptions and conditions.

3.10 Visual Resources and Noise

3.10.1 Visual Resources

The BLM has established a visual inventory and analysis process to provide a systematic interdisciplinary approach to the management of aesthetic values on public lands. The Visual Resource Management (VRM) System (BLM 1986c) defines procedures for evaluating existing scenic quality and assigning visual resource inventory categories based on a combination of scenic values, visual sensitivity, and viewing distances from important viewpoints. Through the RMP process, the visual inventory information is evaluated along with other management considerations to assign VRM classifications to all BLM lands. Four VRM classes have been established to serve two purposes: 1) as an inventory tool portraying the relative value of visual resources; and 2) as a management tool portraying visual management objectives. Management objectives for each of the VRM classes are listed in Table 3-10.

The proposed PSC CO₂ Pipeline project would be developed in the Wyoming Basin physiographic province (Fenneman 1946). The Wyoming Basin is characterized by eroded, elevated plains with isolated low mountains. Vegetation is dominated by mixed shrub grasslands. Figure 3-2 illustrates four characteristic views of the study area landscape. Human modifications to the natural landscape character are sparsely scattered, most commonly back country roads with occasional clusters of ranch buildings and fences. There are few urban settlements. The study area in particular has scattered oil and gas fields connected by existing pipelines.

The proposed pipeline would cross lands assigned VRM Classes II, III, and IV. Where the pipeline would depart from BLM lands, VRM class assignments were extrapolated from surrounding VRM classes on federal land. Approximately 10 percent of the proposed 155-mile main pipeline route would be in Class II areas, 23 percent in Class III areas and the remaining 67 percent in Class IV areas (Table 3-11).

The Oregon/Mormon/Pony Express Trail crossing near MP 129 to MP 133 is managed as a VRM Class II area. The Bozeman Trail crossing near MP 253 is managed as VRM Class I area because of its unique history.

VRM Class III areas along the proposed pipeline are of two types. They either have scenic quality rated B (A is highest quality, C is lowest) or they have Grated scenic quality and are in the

Table 3-10
Visual Resource Management Classes

Class I Objective:	The objective of this class is to preserve the existing character of the landscape. This class provides for natural ecological changes; only and as such it virtually excludes human-caused changes or management activities that would cause surface disturbance. This class is typically applied to designated wilderness or other areas where the goal is to manage the area to allow natural ecological processes to occur without human interference.
Class II Objective:	The objective of this class is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.
Class III Objective:	The objective of this class is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.
Class IV Objective:	The objective of this class is to provide for management activities which require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements.
Rehabilitation Areas:	Areas in need of rehabilitation from a visual standpoint should be flagged during the inventory process. The level of rehabilitation will be determined through the RMP process by assigning the VRM class approved for that particular area.

Source: BLM 1986c.

Table 3-11
Visual Resource Management Class Designations
for the Proposed PSC CO₂ Pipeline Route

Pipeline Milepost	VRM Class	Notes
Mainline Route		
112-113	V ¹	Crooks Gap; Western Nuclear Uranium Mine
113-118	II	Green Mountain
118-120	III	
120-129	IV	
129-133	III (I)	U.S. 287 corridor; Oregon/Mormon/Pony Express Trail managed as Class I
133-143	II	Sweetwater Rocks
143-147	III	
147-159	IV	Keester Basin
159-163	III	Rattlesnake Hills
163-180	IV	
180-191	III	U.S. 20/26 corridor
191-224	IV	Salt Creek ACEC (MP 221.5 – MP 223.5)
224-234	III	I-25/U.S. 87
234-261	IV (I)	Bozeman Trail managed as Class I
261-262	III	Pumpkin Buttes
262-267	IV	Hartzog Draw Well Field
Lateral Route		
L0 to L3	III	Western end of lateral; the remaining 4 miles are excluded from VRM classification

¹The Class V designation was eliminated in the 1986 revision to the VRM system manuals. It is assumed that this would now be a Class IV area flagged for eventual rehabilitation.

Source: BLM 1984a.
BLM 1985a.
BLM 1986b.

foreground/middleground viewing range of a highly sensitive viewing area. The first type occurs mainly in the southwest, adjacent to the two Class II areas and at the Rattlesnake Hills crossing.

There also is a small segment of Class III land at the northwest edge of the Pumpkin Buttes. The second type of Class II areas applies mainly to corridors along the major highways crossing the proposed pipeline route, most notably I-25/ U.S. 87 with 1.3 million vehicle trips per year and U.S. 20/26 with 600,000 vehicle trips per year. The western portion of the lateral route also has a

C rating (approximately 3 miles). The southern 4 miles of the lateral route are excluded from VRM classification due to well field development.

The remaining two-thirds of the proposed pipeline would cross lands assigned VRM Class IV, the BLM's least restrictive visual management class. Class IV areas are either low sensitivity background or seldom seen areas, or they have C-rated scenic quality, or both. A "C" scenic VRM Class II is assigned to two segments near the southwest end of the pipeline. Quality rating doesn't necessarily mean the landscape is unattractive. It merely indicates that the particular visual character is common throughout the Wyoming Basin physiographic province. One segment, about 5 miles long, crosses the scenic western flank of Green Mountain. The second is a 10-mile strip of scenic and visually sensitive land through the Sweetwater Rocks between the Split Rock and Miller Springs WSAs. Both WSAs have Class A scenic quality ratings (BLM 1986b). A potentially important consideration in evaluating the visual effects to the proposed pipeline is steepness of slopes, especially side slopes. While terrain throughout the proposed route is irregular and sometimes steep for short distances, larger slopes with steeper than 10 percent grades occur in only a few places. Most notable of the steep sideslopes is a 4- to 5-mile segment beginning at about MP 114 where the pipeline would cross Green Mountain. Other steep segments are more remote from sensitive viewpoints, such as the Rattlesnake Ridge crossing (at MP 159 to 161) and the Pine Ridge crossing (MP 140 to 144).

3.10.2 Noise

The proposed PSC CO₂ Pipeline Project would be constructed entirely through rural areas where the nearest residences would be at least 0.5 mile from the ROW. In addition, the pipe yard work area would be located in a rural area located northwest of Casper. The closest residence to the pipe yard would be greater than 0.25 mile.

Existing noise sources in rural areas are predominantly natural (i.e., wind, birds). Areas near highways would exhibit vehicle-related noise. The BLM has estimated that the average noise level in the Casper Field Office Area is between 30 and 40 A-weighted decibels (BLM 1997). This range also is suggested in other EAs and in EISs and has been confirmed by field measurements taken elsewhere in Wyoming (Kruger 1981). The background level can be affected by atmospheric conditions, wind levels, topography, vegetation, time of day, bird, and human activity.

3.11 Socioeconomics

This section summarizes historical and present socioeconomic conditions in the four counties (Fremont, Natrona, Johnson, and Campbell) that would be affected by the proposed pipeline project. Elements reviewed include population, economic conditions, income, employment,

housing, local government facilities and services, and local government fiscal conditions. Tables 3-12 through 3-15 summarize baseline conditions within the four-county project area.

3.11.1 Population

The study area is predominantly rural and sparsely populated. Population in Fremont, Johnson, and Campbell counties has increased from 1994 to 1999. Population in Natrona County declined slightly over the same period. Since 1994, population has increased an estimated 2.7 percent in Fremont County, 5.1 percent in Johnson County, and 5.3 percent in Campbell County. Population in Natrona County has decreased 0.7 percent since 1994 (Wyoming Department of Administration and Information 2000).

3.11.2 Economic Conditions

The basic industries for all four counties within the project area include energy production (oil and gas), retail trade, services, and government.

In the early 1980s, Fremont County depended on uranium mining and milling as the mainstay of the local economy. When the industry collapsed in 1983, the economy of Fremont County declined steadily until the latter part of the decade. At the present time, the economy in Fremont County appears to be improving slightly with an 18 percent increase in personal income between 1994 and 1997 (Wyoming Department of Administration and Information 2000). An increase in wealthy, out-of state people also has contributed to increased incomes in Fremont and Natrona Counties.

In addition to the oil, gas, and mining economic base in Natrona County, Casper is currently considered a statewide regional trade center and has shown growth in retail sales and services in the past several years in spite of a declining population. Johnson County strongly depends upon ranching. The economy as a whole has improved recently, as evidenced by a 47 percent increase in personal income from 1994 to 1997 (Wyoming Department of Administration and Information 2000).

Campbell County depends more on coal mining than oil and gas production; coal has been somewhat of an economic stabilizing force in Campbell County. The county has experienced a 44 percent increase in personal income from 1994 to 1997 (Wyoming Department of Administration and Information 2000).

All four counties depend to some extent on the tourist industry, which is reflected in the retail trade and service sectors.

Table 3-12
Fremont County Economic/Demographic Profile for the Proposed
PSC CO₂ Pipeline Project

	1990	1994	1995	1996	1997	1998	1999	Percent Change 1994-1999
Total Population ¹	33,662	35,080	35,607	35,851	35,959	36,044	NA	2.7 ²
Percent Change/Previous Year		4.2	1.5	0.7	0.3	0.2		2.7 ²
Labor Force ³	15,745	17,172	17,545	17,804	17,273	17,557	18,210	6.0
Percent Change/Previous Year		9.1	2.2	1.5	(3.0)	1.6	3.7	
Employment	14,515	15,831	16,261	16,425	15,829	16,174	16,833	
Unemployment	1,230	1,341	1,284	1,379	1,444	1,383	1,377	
Unemployment Rate	7.8	7.8	7.3	7.7	8.4	7.9	7.6	
Total Non-Agricultural Employment ¹	11,700	12,779	13,042	13,245	13,200	13,286	NA	4.0 ²
Manufacturing	585	694	704	784	697	649	NA	(6.5) ²
Mining	468	397	422	391	504	457	NA	15.1 ²
Construction	613	714	825	845	846	959	NA	34.3 ²
Transportation, Communications, and Public Utilities (T.C.P.U.)	581	620	589	584	638	672	NA	8.4 ²
Trade	2,710	2,954	3,087	3,220	3,192	3,052	NA	3.3 ²
Finance, Insurance, and Real Estate (F.I.R.E.)	275	331	333	304	308	341	NA	3.0 ²
Government	3,629	3,900	3,867	3,686	3,489	3,473	NA	(10.9) ²
Services	2,732	3,055	3,096	3,309	3,387	3,549	NA	16.2 ²
Agriculture	108	114	119	122	140	134	NA	17.5 ²
Personal Income (Million \$) ¹	\$446.6	\$558.7	\$598.4	\$629.3	\$659.9	NA	NA	18.1 ⁴
Per Capita Income ¹	\$13,300	\$15,927	\$16,805	\$17,554	\$18,354	NA	NA	15.2 ⁴
1998 County-wide Tax Rate (mills) ¹						76.844	NA	
1998 Total Assessed Valuation (Thousand \$) ¹						\$288,983	NA	
Gross Sales Tax (Thousand \$) ¹	NA	\$11,536	\$13,711	\$15,698	\$15,689	\$17,845	NA	54.7 ²

¹Wyoming Department of Administration and Information 2000.

²1994-1998.

³Wyoming Department of Employment 2000.

⁴1994-1997.

Table 3-13
Natrona County Economic/Demographic Profile for the Proposed
PSC CO₂ Pipeline Project

	1990	1994	1995	1996	1997	1998	1999	Percent Change 1994-1999
Total Population ¹	61,226	63,804	63,807	63,643	63,635	63,341	NA	(0.7) ²
Percent Change/Previous Year		4.2	0.0	(0.3)	0.0	(0.5)		
Labor Force ³	31,896	32,276	32,752	32,693	32,387	33,115	33,571	4.0
Percent Change/Previous Year		1.2	1.5	(0.2)	(0.9)	2.2	1.4	
Employment	29,877	30,137	30,906	30,611	30,460	31,328	33,571	
Unemployment	2,019	2,139	1,846	2,082	1,927	1,787	1,833	
Unemployment Rate	6.3	6.6	5.6	6.4	5.9	5.4	5.5	
Total Non-Agricultural Employment ¹	27,768	28,214	28,765	28,463	29,472	29,906	NA	6.0 ²
Manufacturing	1,667	1,643	1,600	1,547	1,513	1,513	NA	(7.9) ²
Mining	2,443	2,034	1,918	1,800	2,015	2,077	NA	2.1 ²
Construction	1,739	1,515	1,682	1,619	1,751	1,929	NA	27.3 ²
T.C.P.U.	1,623	1,615	1,488	1,440	1,562	1,649	NA	2.1 ²
Trade	7,887	8,254	8,458	8,459	8,409	8,365	NA	1.3 ²
F.I.R.E.	1,362	1,106	1,135	1,155	1,191	1,215	NA	9.9 ²
Government	4,668	4,927	4,923	4,797	4,952	4,905	NA	(0.4) ²
Services	6,087	6,835	7,271	7,354	7,775	7,964	NA	16.5 ²
Agriculture	293	285	291	292	305	289	NA	1.4 ²
Personal Income (Million \$) ¹	\$1,242.1	\$1,454.6	\$1,562.5	\$1,615.9	\$1,709.6	NA	NA	37.6 ⁴
Per Capita Income ¹	\$20,292	\$22,798	\$24,487	\$25,390	\$26,866	NA	NA	17.8 ⁴
1998 County-wide Tax Rate (mills) ¹						72.926	NA	
1998 Total Assessed Valuation (Thousand \$) ¹						\$416,733	NA	
Gross Sales Tax (Thousand \$) ¹	NA	\$43,091	\$45,426	\$46,332	\$48,070	\$50,219	NA	16.5 ²

¹Wyoming Department of Administration and Information 2000.

²1994-1998.

³Wyoming Department of Employment 2000.

⁴1994-1997.

Table 3-14
Johnson County Economic/Demographic Profile for the Proposed
PSC CO₂ Pipeline Project

	1990	1994	1995	1996	1997	1998	1999	Percent Change 1994-1999
Total Population ¹	6,145	6,493	6,623	6,712	6,769	6,824	NA	5.1 ²
Percent Change/Previous Year		5.7	2.0	1.3	0.8	0.8		
Labor Force ³	3,414	3,628	3,591	3,747	3,681	3,746	3,958	9.1
Percent Change/Previous Year		6.3	(1.0)	4.3	(1.8)	1.8	5.7	
Employment	3,243	3,478	3,456	3,604	3,512	3,592	3,822	
Unemployment	171	150	135	143	169	154	136	
Unemployment Rate	5.0	4.1	3.8	3.8	4.6	4.1	3.4	
Total Non-Agricultural Employment ¹	2,226	2,413	2,369	2,484	2,513	2,511	NA	4.1 ²
Manufacturing	66	119	74	99	122	105	NA	(11.8) ²
Mining	161	130	105	111	123	101	NA	(22.3) ²
Construction	85	131	127	127	140	160	NA	22.1 ²
T.C.P.U.	225	95	92	96	97	82	NA	(13.7) ²
Trade	607	635	649	677	695	696	NA	9.6 ²
F.I.R.E.	87	102	103	107	110	119	NA	16.7 ²
Government	701	726	722	715	728	740	NA	1.9 ²
Services	272	418	433	495	446	471	NA	12.7 ²
Agriculture	23	56	64	56	52	39	NA	(30.4) ²
Personal Income (Million \$) ¹	\$101.3	\$129.5	\$129.8	\$139.8	\$148.5	NA	NA	46.6 ⁴
Per Capita Income ¹	\$16,419	\$19,945	\$19,600	\$20,827	\$21,932	NA	NA	12.2 ⁴
1998 County-wide Tax Rate (mills)						67.009	NA	
1998 Total Assessed Valuation (Thousand \$)						\$79,674	NA	
Gross Sales Tax (Thousand \$)	NA	\$2,619	\$2,795	\$2,972	\$3,558	\$4,118	NA	57.3 ²

¹Wyoming Department of Administration and Information 2000.

²1994-1998.

³Wyoming Department of Employment 2000.

⁴1994-1997.

Table 3-15
Campbell County Economic/Demographic Profile for the Proposed
PSC CO₂ Pipeline Project

	1990	1994	1995	1996	1997	1998	1999	Percent Change 1994-1999
Total Population ¹	29,370	30,824	31,442	31,931	32,071	32,465	NA	5.3 ²
Percent Change/Previous Year		5.0	2.0	1.6	0.4	1.2		
Labor Force ³	16,402	18,139	18,362	18,571	18,535	19,161	19,770	9.0
Percent Change/Previous Year		10.6	1.2	1.1	(0.2)	3.4	3.2	
Employment	15,562	17,246	17,500	17,695	17,556	18,235	18,753	
Unemployment	840	893	862	876	979	926	1,017	
Unemployment Rate	5.1	4.9	4.7	4.7	5.3	4.8	5.1	
Total Non-Agricultural Employment ¹	14,072	15,640	15,736	15,988	16,353	16,810	NA	7.5 ²
Manufacturing	136	377	376	409	416	487	NA	29.2 ²
Mining	4,387	4,421	4,075	4,087	4,133	4,236	NA	(4.2) ²
Construction	730	1,051	1,324	1,403	1,583	1,491	NA	41.9 ²
T.C.P.U.	672	692	742	742	762	785	NA	13.4 ²
Trade	2,924	3,327	3,392	3,481	3,565	3,546	NA	6.6 ²
F.I.R.E.	329	395	407	399	375	368	NA	(6.8) ²
Government	2,754	2,962	2,989	3,026	3,037	3,101	NA	4.7 ²
Services	2,092	2,324	2,338	2,360	2,391	2,683	NA	15.4 ²
Agriculture	49	91	93	84	92	113	NA	24.2 ²
Personal Income (Million \$) ¹	\$513.3	\$630.1	\$664.9	\$699.8	\$740.2	NA	NA	44.2 ⁴
Per Capita Income ¹	\$17,456	\$20,442	\$21,162	\$21,915	\$23,079	NA	NA	12.9 ⁴
1998 County-wide Tax Rate (mills) ¹						60.419	NA	
1998 Total Assessed Valuation (Thousand \$) ¹						\$1,495,260	NA	
Gross Sales Tax (Thousand \$) ¹	NA	\$24,111	\$26,021	\$26,748	\$32,301	\$39,909	NA	65.5 ²

¹Wyoming Department of Administration and Information 2000.

²1994-1998.

³Wyoming Department of Employment 2000.

⁴1994-1997.

3.11.3 Income

Tables 3-12 through 3-15 show estimated personal and per capita income for each of the four counties in the project area. All four counties showed increases in county-wide personal income from 1994 to 1997. Average weekly wages in the mining and construction sectors are shown in Table 3-16. Wage rates have fluctuated through the years, particularly in the construction sector, but have generally increased through the period. Energy production is considered the highest paying sector for wage and salary employment.

Table 3-16
Average Weekly Wage for the Proposed PSC CO₂ Pipeline Project

County and Sector	(dollars)					
	1993	1994	1995	1996	1997	1998
Fremont						
Construction	388	397	410	396	427	452
Mining	611	667	684	687	726	831
Natrona						
Construction	447	446	454	465	502	546
Mining	688	692	688	707	773	750
Johnson						
Construction	291	333	367	334	341	367
Mining	606	660	727	728	677	678
Campbell						
Construction	469	443	477	499	532	559
Mining	887	889	931	973	1,014	1,032

Source: Wyoming Department of Employment (2000).

3.11.4 Employment

Total employment throughout the area has increased from 1994 through 1998. As shown in Tables 3-12 through 3-15, total non-agricultural employment has increased by 4.0 percent in Fremont County; 6.0 percent in Natrona County; 4.1 percent in Johnson County, and 7.5 percent in Campbell County from 1994 to 1998. Employment in the construction sector showed the greatest increase in all counties. Employment in other industries fluctuated during the period, with decreases in the manufacturing sector in all counties except Campbell County, and increases in the trade sector in all four counties.

Unemployment rates in the four counties fluctuated during the period from 1994 to 1999, with a generally declining trend, with the exception of Campbell County, which showed a slight increase.

3.11.5 Housing

Housing availability throughout the area is adequate for the existing population. Towns and municipalities in close proximity to the proposed pipeline route include Casper, Lander, Rawlins, Jeffrey City, Edgerton, Powder River, and Kaycee. Casper is the largest municipality and is centrally located to the project. Given the short duration of the construction period, it is expected that the majority of workers locating from outside the area would use temporary accommodations in campgrounds/RV parks and hotels/motels. In Jeffrey City, a former support community for the Western Nuclear Split Rock Mill Site, approximately 20 three-bedroom apartment units are vacant and available to accommodate a temporary work force. Approximately 20 trailer lots with water and sewer hookups also are available in Jeffrey City (Richmond 1999).

Table 3-17 shows temporary housing available in close proximity to the proposed pipeline route. Hotels/motels and campgrounds with RV sites are available in all study area communities. Communities with larger populations, such as Casper, have more accommodations available.

Table 3-17
Temporary Housing Accommodations for the Proposed PSC CO₂ Pipeline Project

Type/Location of Accommodation	Number of Locations	Number of Units	Number of Tent Sites	Number of Trailer Sites	Dates Available
Hotel/Motel, Casper	24	1,891			
Hotel/Motel, Rawlins	7	575			
Hotel/Motel, Buffalo	15	415			
Hotel/Motel, Edgerton-Midwest	1	20			
Hotel/Motel, Powder River	1	18			
Hotel/Motel, Kaycee	3	50			
Hotel/Motel, Gillette	14	1,129			
Hotel/Motel, Lander	11	259			
Hotel/Motel, Jeffrey City	1	18			
Campground, Casper	9 (7 private, 2 BLM)		40+	270+	3 year-round 6 seasonal
Campground, Jeffrey City	2 (1 private, 1 BLM)		20+	16+	Seasonal
Campground, Powder River	1 (private)		20	20	Seasonal
Campground, Rawlins	4 (private)		41+	391	Seasonal
Campground, Kaycee	4 (3 private, 1 City Park)		Available	38+	3 year-round 1 seasonal
Campground, Buffalo	5 (private)		110	289	2 year-round 3 seasonal
Campground, Lander	17 (6 private, 2 BLM, 6 USFS, 1 City Park)		126+	231+	2 year-round 15 seasonal

Source: Wyoming Travel and Tourism. (2000).

Similarly, demand for these accommodations also may be greater in these communities, particularly during peak tourist seasons such as during the summer months and during hunting seasons.

The average monthly rent for a two-bedroom apartment in Natrona County is \$340. A two to three-bedroom single family home rents for \$480 per month on average, and a mobile home rents for \$385 per month on average (Wyoming Department of Administration and Information 2000).

3.11.6 Local Government Facilities and Services

Fremont, Natrona, Johnson, and Campbell county governments all provide a wide array of governmental services including general county government, law enforcement, fire protection, road and bridge infrastructure, solid waste disposal, medical and ambulance, and education. Most public facilities and services, particularly the infrastructure, adequately serve the existing population and could support future growth.

3.11.7 Local Fiscal Conditions

As shown in Tables 3-12 through 3-15, gross sales tax receipts have increased in all four study area counties during the period 1994-1999. Properties assessed by the State, including pipelines, are assessed at, and taxed on, 11.5 percent of value (Wyoming Department of Revenue 1998a). Property taxes are a primary source of county and school district revenue, and tax revenues are allocated to county funds, school districts, special districts, and municipalities.

3.12 Environmental Justice

Since publication of Executive Order (EO) 12898, Federal Action to Address Environmental Justice in Minority Populations and Low-Income Populations in the Federal Register (FR) on February 11, 1994 (59 FR 7629), federal agencies have been developing a strategy for implementing the order. Currently, the federal agencies rely on the Environmental Justice Guidance Under the NEPA prepared by the CEQ (the guidance) (USEPA1997), in implementing EO 12898 in preparing NEPA documents.

Pursuant to EO 12898 on Environmental Justice, federal agencies shall make the achievement of environmental justice part of their mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority populations, low-income populations, and Indian tribes, and allowing all portions of the population an opportunity to participate in the development of, compliance with, and enforcement of federal laws, regulations, and policies affecting human

health or the environment regardless of race, color, national origin, or income. EO 12898 requires identifying whether an area potentially affected by a proposed federal action may include minority populations and low-income populations and seek input accordingly.

3.12.1 Minority Populations

Minorities include individuals who are members of the following population groups: American Indian or Alaskan Native; Asian or Pacific Islander; African American, not of Hispanic origin; or Hispanic. As directed by EO 12898, agencies should consider the composition of the affected area, to determine whether minority populations are present in the area affected by the proposed action. The guidance states that “a minority population may be present if the minority population percentage of the affected area is ‘meaningfully greater’ than the minority population percentage in the general population or other ‘appropriate unit of geographic analysis’ (USEPA 1997).” For the purpose of this EA analysis, the “affected area” is defined as any community located within five miles of the proposed PSC pipeline ROW.

The proposed PSC pipeline would pass through a sparsely populated area dotted with numerous oil well fields and sprawling cattle ranches. The nearest communities that could be affected by the project are Powder River, Edgerton, and Midwest. All three of these communities are located in Natrona County. Powder River is located approximately three miles west of the project area, Edgerton and Midwest are southwest by approximately 4 miles and 2 miles, respectively. The U.S. Census Bureau estimated the July 1999 population of Edgerton at 255 and Midwest at 473 (Census 1999). Population estimates for Powder River were not available.

Minority population percentages were not available through the U.S. Census Bureau for geographic units below the county level. Therefore, minority population percentages for Natrona County were used in this analysis. According to the 1990 U.S. Census Bureau statistics (at this time, the census data on minority populations has not been updated since 1990), the population of Natrona County was primarily white (approximately 97.0 percent), with the largest minority population as “other race” (approximately 1.2 percent), followed by Black (approximately .008 percent), American Indian (approximately .007 percent) and Asian or Pacific Islander (approximately .005 percent) (Census 1990). It is assumed that the minority populations living in Natrona County have not changed significantly over the past decade and that the 1990 percentages are similar to the current minority population percentages. It also is assumed that the minority population percentages for Powder River, Edgerton, and Midwest are similar to Natrona County.

3.12.2 Low-Income Populations

The guidance recommends that low-income populations in an affected area be identified using the annual statistical poverty thresholds from the Bureau of Census' Current Population Reports, Series P-60 on Income and Poverty. In identifying low-income populations, agencies may consider as a community either a group of individuals living in geographic proximity to one another, or a set of individuals (such as migrant workers or Native Americans), where either type of group experiences common conditions of environmental exposure. For the purpose of this EA analysis, the "affected area" is defined as any community within five miles of the proposed PSC pipeline ROW.

As stated previously, the proposed PSC pipeline would pass through a rural and sparsely populated area. The proposed route would not pass through or be adjacent to any communities; however, the towns of Powder River, Edgerton, and Midwest are located within five miles of the proposed PSC pipeline ROW or in what has been defined as the "affected area." Median household income estimates were not available for geographic units below the county level. Income estimates were available for Natrona County; however, the data has not been updated since 1997. According to the 1997 U.S. Census Bureau estimates, the median household income for Natrona County was \$34,685 (Census 1997). It is assumed that the median household income for Natrona County has not changed significantly over the past 3 years and that the 1997 figure is similar to the current median household income. It also is assumed that the median household income for the towns of Powder River, Edgerton, and Midwest are similar to Natrona County.

The guidance recommends that low-income populations in an affected area be identified using the annual statistical poverty thresholds from the Bureau of Census' Current Population Reports, Series P-60 on Income and Poverty. Since the median household income for Natrona County is based on 1997 data, the 1997 poverty threshold was used for this analysis. The poverty threshold was based on a 3-person household. The U.S. Census Bureau 1997 poverty threshold definition for a 3-person household was \$12,802 (Census 1997). The 1997 median household income for Natrona County (\$34,685) indicates a general level of income for the county that was well above the poverty threshold.

3.13 Transportation

Three major federal highways and one state highway would be crossed by the proposed pipeline route; no highways would be crossed by the lateral route. I-25 would be crossed at approximately MP 228, which connects south to Casper, Cheyenne, and Denver and North to Sheridan and Billings, Montana. I-25 is a four-lane, divided highway developed to Interstate Systems standards. U.S. 20/26 would be crossed approximately 41 miles southwest of the route at MP 187. U.S.

20/26 connects west to Shoshoni, Riverton, or Thermopolis and east to Casper. U.S. 20/26 is a paved, two-lane, primary highway. U.S. 287 runs northwest to Lander and southeast to Rawlins where it intersects to I-80. U.S. 287 also is a paved, two-lane, primary highway. The only state highway that would be crossed by the proposed route is WY 192. WY 192 is a paved, two-lane, secondary highway connecting Kaycee at I-25 with WY 387 northeast of Edgerton. Table 3-18 lists traffic levels on the major highways.

Areas between the major highways are served by an irregular, complex network of unpaved roads ranging from unmaintained 4-wheel-drive trails to gravel-surfaced county roads. In certain energy development areas, the networks are fairly dense, having been constructed for resource development purposes. Notable access points include Dry Creek Road (MP 151), Poison Spider Road (MP 169), Powder River Road (MP 181), North Natrona Road (MP 191), Thirty-three Mile Road (MP 206), and Smoky Gap Road (MP 223).

Table 3-18
Traffic Levels for Major Highways Crossed by the Proposed
PSC CO₂ Pipeline, 1998

Highway	Location	1998 Traffic Counts			
		AADT ¹		Total Annual ²	
		Total Traffic	Trucks	Total Traffic	Trucks
U.S. 287	East of Jeffrey City (MP 22-23)	940	120	343,100	43,800
U.S. 20/26	Between Powder River and Natrona (MP 30-38)	2,340	400	854,100	146,000
I-25	near Exit 227 (MP 223-227)	2,830	730	1,032,950	266,450
WY 192	near Lynch (MP 30-35)	180	40	65,700	14,600

¹Annual Average Daily Traffic.

²Extrapolated from AADT.

Source: Wyoming Department of Transportation.

The pipeline route has rail service via Burlington Northern through Casper or Gillette and via Union Pacific through Rawlins approximately 50 miles to the south.

3.14 Cultural Resources/Native American

3.14.1 Cultural Resources

A Class I cultural resources inventory (literature search) was conducted in 1985 by personnel from Larson-Tibesar Associates (LTA) through the Wyoming Recreation Commission (State Historic Preservation Office, Records Division, Laramie) as part of the Draft Bairoil/Dakota Carbon Dioxide Projects EIS (BLM 1985a). Additionally, the BLM General Land Office Plats were reviewed in order to compile a list of potential historic sites, including historic trail crossings in and near the proposed pipeline route. The literature search identified previous cultural resource inventories adjacent to the proposed pipeline route conducted by Commonwealth Associates (Commonwealth 1983), Powers Elevation Corporation (Brechtel et al. 1984), and P-III Associates (Coulam n.d.).

The National Historic Preservation Act (NHPA) requires that all significant cultural resources be identified and considered prior to development and ensures that prehistoric and historic sites important to our national heritage are not inadvertently damaged or destroyed by federally initiated or authorized actions. In compliance with regulations established in the 1966 NHPA, (36 CFR Part 800), an intensive Class III cultural resources inventory (pedestrian survey) and test excavations were conducted by LTA from June to October 1985 on portions of the pipeline not previously surveyed (Hilman et al. 1987). The pedestrian survey included the pipeline ROW from Bairoil to the Wyoming border. Cultural resources located in the survey area were reviewed to determine if any would be subject to impacts that could affect their eligibility based on National Register of Historic Places (NRHP) criteria for evaluation (36 CFR 60.4 [a-d]).

The intensive pedestrian survey covered a corridor width of 150 and 200 feet for the pipeline and 100 feet for the potential access roads. For the proposed pipeline, a 150-foot-wide corridor was inventoried where the proposed CO₂ line would parallel an existing pipeline. A 200-foot-wide corridor was inventoried where the line would not parallel any existing pipeline.

A total of 138 sites were recorded by LTA as a result of the pedestrian survey. These include 3 historic trails, 11 other historic sites, 113 prehistoric sites, and 11 sites with both prehistoric and historic components. The prehistoric sites include lithic scatters, seasonal camps, house pits, and stone circles. Historic sites documented during the survey include the abandoned Chicago & NW railroad bed, Merino Station and railroad grade, trash scatters, and historic homesteads. Five crossings of three historic trails were located, three of the Oregon/Mormon/Pony Express Trail and one each for the Bridger and Bozeman Trails. Of the 138 documented sites, 34 are recommended as eligible for nomination to the NRHP. Test excavations were conducted at 22 of the prehistoric sites in order to determine the presence of buried cultural deposits and assess

potential impacts to the sites. Testing consisted of shovel tests, formal excavation units, and backhoe trenching.

In 1990, archaeological investigations were conducted by Archaeological Services of Western Wyoming College (AS-WWC) along the proposed Wyoming-Dakota CO₂ Pipeline, Segment 2 (Bower et al. 1991). The AS-WWC investigations were a continuation of cultural resource studies initiated in 1985 by LTA. The purpose of the 1990 investigations was to complete all outstanding inventory and site evaluation requirements and identify mitigation needs, i.e., complete the cultural resource requirements for obtaining ROW approval.

AS-WWC investigations included revisiting 48 sites that were recorded by LTA in 1985, an additional Class III inventory, and test excavations. These investigations resulted in the discovery of four previously unrecorded prehistoric sites and six isolated finds, and the re-recording of six previously discovered sites. Of the ten sites recorded by AS-WWC, sites 48NA728 and 48FR1499 were recommended as eligible to the NRHP with SHPO concurrence (Marceau 1991a). In addition, five historic trail crossings were documented; three of the Oregon/Mormon/Pony Express Trail and one each for the Bridger and Bozeman Trails (Table 3-19).

Table 3-19
Historic Trails Eligible to the NRHP Documented Along the Proposed
PSC CO₂ Pipeline Route

Site No.	Name	Mile Post	Legal Location	NRHP	Condition
48FR736	Oregon/Mormon/ Pony Express	132.0	Section 21, T29N, R89W	Eligible	Ruts not intact, two-track trail
		132.2	Section 20, T29N, R89W	Eligible	Ruts not intact, two-track trail
		132.3	Section 29, T29N, R89W	Eligible	Ruts not intact, two-track trail
48NA207	Bridger Trail	175.4	Section 14, T34N, R85W	Eligible	Ruts not intact, two-track trail
48JO134	Bozeman Trail	253.0	Section 29, T44N, R77W	Eligible	Ruts not intact, two-track trail

¹BLM (1985a) lists several additional trails purported to be in the study area. These could not be located or confirmed during the inventory.

Where the proposed pipeline paralleled an existing pipeline, a 150-foot-wide corridor was surveyed. A 200-foot-wide corridor was surveyed where a portion of the existing pipeline ran parallel to the Sweetwater Ranch Road. A 100-foot-wide corridor was surveyed for proposed access roads.

LTA and AS-WWC's inventories identified a total of 137 sites within the currently proposed pipeline ROW and access road survey corridor; 29 of these are recommended as eligible to the NRHP (Table 3-20). As a result of these inventories and test excavations, data recovery was

Table 3-20
NRHP - Eligible Sites Located During the Class III Pedestrian Survey

Site Number	Site Type	Project Element
Lander Field Office		
48FR736	Oregon/Mormon/Pony Express Trail	Pipeline
48FR1475	Open camp	Pipeline
48FR1499	Open camp	Pipeline
48NA257	Open camp/lithic procurement	Pipeline
48NA359	Lithic scatter/stone circle	Pipeline
48NA728	Open camp	Pipeline
48NA884	Open camp	Pipeline
48NA1060	Open camp	Pipeline
48NA4067	Open camp/stone circles	Pipeline
Casper Field Office		
48NA207	Bridger Trail	Pipeline
48NA226	Stone circles/open camp	Pipeline
48NA242	North-south railroad grade	Pipeline
48NA1019	Lithic scatter/historic trash scatter	Pipeline
48NA1061	Stone feature, open camp	Pipeline
48NA1079	Open camp	Pipeline
48NA1080	Open camp	Pipeline
48NA1083	Open camp	Pipeline
48NA1086	Open camp	Pipeline
48NA1090	Morton Ranch historic site	Pipeline
Buffalo Field Office		
48CA2195	Open camp	Pipeline
48JO134	Bozeman Trail	Pipeline
48JO946	Open camp	Pipeline
48JO947	Open Camp	Pipeline
48JO950	Lithic Scatter	Pipeline
48JO954	Open camp	Pipeline
48JO938	Open camp/historic trash	Pipeline
48JO958	Open camp	Pipeline
48JO959	Open camp	Pipeline
48JO963	Open camp	Pipeline

Source: Bower et al. (1991).

recommended for three prehistoric sites (48NA1079, 48NA1086, 48CA2195) to mitigate possible adverse effects from construction activities. Site 48NA1079 contained a house pit dated to ca. 5200 BP (before present), which was overlain by a second component dated to ca. 4150 BP. Site 48NA1086 produced two stratified residential components dating to ca. 3300 and 1700 BP, respectively. Site 48NA2195 is a single component residential site dated to ca. 1200 BP (Darlington et al. 1995). Features, chipped stone tools, faunal remains, and floral remains were recorded during the excavations. All three sites were recommended as eligible to the NRHP, based on the documented presence of in situ subsurface cultural components. The data recovery work at the three sites served to mitigate adverse effects associated with the construction of the proposed pipeline.

Site 48NA1060 is an NRHP-eligible prehistoric open camp that was recorded and tested by LTA in 1985 and later by AS-WWC in 1990. The artifacts located on the surface of the site include lithic debitage, lithic tools, groundstone, and burned stone. Test excavations, shovel tests, and backhoe trenches revealed the presence of subsurface features and artifacts in the proposed pipeline ROW, but no intact cultural deposits were found. At that time, data recovery was not recommended for the site based on evidence indicating that the site had been disturbed by natural processes and that intact cultural deposits associated with the features were not present.

The Wyoming SHPO reviewed the site evaluations, mitigation procedures, and data recovery plan submitted by AS-WWC following the 1990 cultural resources investigations. Following the review, the SHPO issued a letter on August 22, 1991 stating that they agree with AS-WWC's determination that there would be no adverse effects to historic properties if the mitigation procedures and data recovery plan were carried out (Marceau 1991b). On January 11, 1994, the BLM received a letter from the Advisory Council on Historic Preservation stating that they concur with the results of the archaeological investigations conducted for the proposed Wyoming-Dakota CO₂ Pipeline, Segment 2, and that all pre-construction requirements have been met (Nissley 1994).

During June 2000, a literature search and records review at the Wyoming State Historic Preservation Office, Records Division, was conducted by Western Archaeological Services (WAS) for the proposed 7-mile lateral pipeline. The review covered a 1-mile-wide corridor either side of the pipeline centerline. Several cultural resources investigations have been documented in the project area. These include Class III inventories for buried communication cables, CO₂ pipelines, highways, well pads, access roads, and historic inventories of the Salt Creek Oil Field. Six sites, five prehistoric and one historic, are recorded within the proposed project area; however, none of these sites are located within the proposed pipeline ROW. Because of their location outside of the proposed pipeline ROW, the six previously recorded sites would not be impacted by the proposed 7-mile lateral pipeline.

In addition to the six sites mentioned above, the Bozeman Trail (48JO1599) also was identified in the literature search for the proposed 7-mile lateral pipeline. However, the legal description and county location were inconsistent, indicating an error in the record. As a result of consultation between WAS and the BLM it was determined that an alternate of the Bozeman Trail trends north through the town of Midwest, over 1 mile east of the proposed pipeline route. Based on this information, the record appears to be in error, and the Bozeman Trail is not located within the project area. WAS notified the Records Division of the error.

In June 2000, WAS conducted a cultural resources pedestrian survey of the proposed 7-mile lateral pipeline. The survey corridor measured 50 feet either side of the pipeline centerline. No cultural resources were located during the survey. WAS has recommended cultural clearance for the proposed 7-mile Petro Source CO₂ lateral pipeline.

A PA between the BLM and Wyoming SHPO has been signed. A copy of the PA is provided in Appendix A. The PA outlines cultural survey protocol to be followed, report and treatment plan requirements, and procedures for mitigating potential impacts to identified and unidentified cultural resources. Petro Source has agreed to all stipulations identified in the PA and has incorporated them into their environmental protection measures (Section 2.5.8). Protection measures identified in the PA include construction monitoring during topsoil stripping and ROW preparation where the ROW crosses site 48NA1060, open trench inspection (OTI) for evidence of buried cultural deposits, and treatment of human remains.

3.14.2 Native American Consultation

Native American (traditional) religious and cultural concerns include archaeological sites and areas and materials important to Native Americans for religious and/or traditional use. Sensitive resources could include prehistoric sites, features and artifacts, contemporary sacred areas, burial sites, traditional use areas, and sources for materials used in the production of sacred objects and traditional tools. Traditional Cultural Properties are eligible for inclusion in the NRHP because of their association with cultural practices or beliefs of a living community that are rooted in the community's history and are important in maintaining that community's cultural identity.

It is the responsibility of all federal agencies to comply with the requirements of Section 106 and the Advisory Council's regulations when planning and carrying out their undertakings. In doing so, they are required to consult with Native American groups or other interested parties depending on the specifics of the undertaking. Such consultation with Native American groups or other interested parties is central to the Section 106 process. Consultation is defined in the Council's regulations as: The process of seeking, discussing, and considering the views of other

participants, and, where feasible, seeking agreement with them regarding matters arising in the Section 106 process [36 CFR § 800.16(f)].

As part of the Section 106 compliance process, a certified/registered letter has been sent to all federally recognized Native American groups and other interested parties either residing in or with cultural ties to the proposed project area. The letter informs these parties of the proposed undertaking and solicits their concern/comments regarding possible historical and traditional ties to the area or the presence of religious or spiritual sites. A total of six applicable Native American groups were contacted: Eastern Shoshone, Northern Arapahoe, Southern Cheyenne, Northern Cheyenne Crow, and Oglala Sioux. Any specific information provided by Tribal members concerning Native American traditional use and/or spiritual sites in or near the project area would remain confidential.